UNIVERSITY
OF
SANTA CLARA

CATALOGUE FOR THE
SEVENTY-FIFTH YEAR

1925-1926

ANNOUNCEMENTS 1926-1927

UNIVERSITY OF SANTA CLARA

COLLEGE OF LIBERAL ARTS

Courses in Letters, Philosophy, Science, and Education leading to the Bachelor's degree.

GRADUATE DEPARTMENT

Courses leading to the higher degrees.

COLLEGE OF BUSINESS ADMINISTRATION

A four year course leading to the degree of Bachelor of Commercial Science.

COLLEGE OF ENGINEERING

Courses in Civil, Mechanical, and Electrical Engineering leading to Professional Degrees.

INSTITUTE OF LAW

A four-year course leading to the degree of Bachelor of Laws, following the pre-legal work in the College of Liberal Arts.

PRE-MEDICAL DEPARTMENT

A standard two year course preparatory to Medicine meeting the requirements of the American Medical Association.

THE OBSERVATORY

Astronomical, Meteorological and Seismological Observatory.

For Catalogue of the University or Bulletins of the Colleges
Address

THE REGISTRAR
University of Santa Clara, Santa Clara, California

University of Santa Clara

CATALOGUE

FOR THE SEVENTY-FIFTH YEAR

1925-1926

ANNOUNCEMENTS 1926-1927

To mould men after the model of the Man-God, and thus to form them to serve their fellowmen, their country and their God; this is the ideal and the purpose of the University of Santa Clara.

PUBLISHED BY THE UNIVERSITY OF SANTA CLARA
SANTA CLARA, CALIFORNIA
MARCH, 1926

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The Corporate Title of the University is

THE PRESIDENT AND BOARD OF TRUSTEES OF SANTA CLARA COLLEGE

BOARD OF TRUSTEES

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President

JOHN JOSEPH HAYES
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THE PRESIDENT THE SECRETARY

CLARENCE C. COOLIDGE, Esq.

CONSULTING ATTORNEY

CLARENCE C. COOLIDGE, Esq.

CALENDAR

First Semester—1926

August 16, Monday	Registration of non-resident students in all departments, 9 a. m. Examinations for removal of conditions, 1:30 p. m.
August 17, Tuesday	Registration of resident students in all departments, 10:30 a. m. Classes begin at 2:30 p. m.
August 18, Wednesday	Classes begin in Institute of Law, 6:55 p. m.
August 25, Wednesday	Mass of the Holy Ghost.
September 5, Sunday	Students' Retreat begins at 6:30 p. m.
September 9, Thursday	Admission Day; Students' Retreat ends; a holiday.
October 12, Tuesday	Columbus Day; a holiday.
November 1, Monday	All Saints' Day; a holiday.
November 11, Thursday	Requiem Mass for deceased members of Faculty and Alumni.
November 19, Friday	Dramatic Art Contest.
November 25, Thursday	Thanksgiving Day; a holiday.
November 29, Monday	Repetitions begin.
December 8, Wednesday	Feast of the Immaculate Conception; a holiday.
December 17, Friday	Mid-year examinations begin.
December 22, Wednesday	Christmas recess begins at 3:30 p. m.

Second Semester—1927

January 3, Monday	Christmas recess ends at 6 p. m. Second semester begins.
January 15, Saturday	Last day to submit for the approval of the Dean of the Faculties, subjects for graduation theses in all departments and of essays in sophomore class.
February 7, Monday	Last day to submit skits for the Leahy prize.
February 22, Tuesday	Washington's birthday; a holiday.
March 7, Monday	Last day to submit essays for the Redwood prize.
March 17, Thursday	St. Patrick's Day; a holiday.
March 21, Monday	Last day to submit short-stories for the McCann prize.
March 25, Friday	Oratorical contest for Owl prize.
April 11, Monday	Archbishop's medal contest in Religion.
April 13, Wednesday	Easter Recess begins at 3:30 p. m.
April 19, Tuesday	Easter Recess ends at 6 p. m.
April 20, Wednesday	Last day to submit graduation theses in all departments and sophomore essays.
April 22, Friday	Ryland Debate. Last day to submit scientific essays for the Orella prize.
May 2, Monday	General repetitions begin.
May 18, Wednesday	Written examinations for seniors begin, followed immediately by orals.
May 20, Friday	General examinations begin.
May 26, Thursday	Ascension Thursday; a holiday.
May 29, Sunday	Baccalaureate Mass and Sermon. Seventy-sixth Annual Commencement.

OFFICERS OF ADMINISTRATION

ZACHEUS JOSEPH MAHER, S. J., A. M.
President

CORNELIUS JOSEPH McCOY, S. J., A. M.
Vice-President, Director of Discipline

JOHN ALOYSIUS LENNON, S. J., A. M.
Dean of the Faculties, Registrar, Director of Studies

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Secretary and Treasurer

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Chaplain

JOSEPH MATTHEW GEORGEN, S. J., A. M.
Superintendent of Buildings and Grounds

EDMUND JOSEPH RYAN, S. J., A. M.
Moderator of the Associated Student Body, and of the Alumni Association, Faculty Director of Athletics

CHARLES D. SOUTH, M. A., LITT. D.
Librarian

FREDERICK GERLACH, M. S., M. D.
Visiting Physician and Surgeon

EUGENE MICHAEL BACIGALUPI, S. J., A. M.
Director of Music

ADAM WALSH, B. S.
Director of Physical Education

FACULTY COMMITTEES

ATHLETICS—Board of Athletic Control. The Director of Studies, the Director of Discipline, the Treasurer.

ADVISORY BOARD ON ATHLETICS.—Three members of the Faculty, three members of the Alumni, and three members of the Student body.

ATTENDANCE—The Director of Studies, and the Director of Discipline.

CREDENTIALS AND REGISTRATION—The Director of Studies, the Deans of the various Colleges, and the Director of Discipline.

DISCIPLINE—The Director of Discipline and the Director of Studies.

DRAMATICS AND PUBLIC EXERCISES—The President, the Director of Studies, the Director of Discipline, and the Director of Dramatics.

EXAMINATIONS—The President, the Director of Studies, and the Professors of the various courses.

POST-GRADUATE STUDIES—The President, the Director of Studies and the Professors of the subjects in which the Post-Graduate work is taken.

SCHOLARSHIP AND STANDING—The Director of Studies, and the Deans of the several Colleges.

STUDENT PUBLICATIONS—The Director of Studies, the Director of Discipline, and the Faculty Moderator.

THESES—The Director of Studies and the Professors of the Upper Division Courses.

GENERAL INFORMATION

LOCATION

The University of Santa Clara, conducted by the Jesuit Fathers, is situated at Santa Clara on the site of the old Mission, in the southern part of the San Francisco metropolitan district and immediately adjacent to San Jose. Frequent railroad, street-car and bus service provides easy access to the various Bay cities, and direct connections to all parts of California and the west.

The valley of Santa Clara is famous throughout the world for the beauty of its scenery, the salubrity of its climate, and the excellence of its fruits. The climate is mild and equable both in summer and winter, and on that account singularly favorable for persistent study and research as well as for the maximum of agreeable out-of-doors recreation which such work makes necessary.

HISTORY

Mission Santa Clara. On January 12, 1777, two Franciscan Padres, de la Pena and Murguia, planted the Mission Cross and laid the foundations of Mission Santa Clara on the banks of the Guadalupe, about a mile and a half from the University grounds. Two years later, a flood destroyed both church and monastery, and the Padres in consequence removed the Mission to the second site, two blocks from the present church. There, on November 9, 1781, they laid the foundation of a large adobe church and mission buildings. Three years later, on May 15, 1784, the new church was dedicated by the Venerable Padre Serra, then Padre Presidente of the Missions of California.

Owing to damage by earthquakes in 1812 and 1818 the Padres were forced to build anew and this time selected the site of the present Mission. There, on August 11, 1822, a still larger church was dedicated. With the passing of time the original church has been largely rebuilt, though the chancel and the interior arrangements have remained substantially as originally constructed.

In 1836 Mission Santa Clara was secularized and passed from the hands of the devoted Padres into those of politicians, who robbed the Mission of her lands and oppressed or drove away her children. When Rt. Rev. Joseph Sadoc Alemany, O. P., arrived as Bishop of the Diocese of San Francisco in 1850, he found only one Franciscan in charge of the Mission, which had been restored by the American government, though in a sadly reduced form.

Santa Clara College. Desiring to save the remnants of the Mission, and also to start a college to meet the growing need of the times the Bishop invited the Society of Jesus to Santa Clara. The invitation was accepted, and accordingly on March 19, 1851, Father John Nobili laid the foundation of Santa Clara College.

He adapted the old adobe buildings to the requirements of a college. On April 28, 1855, the institution was chartered a University and continued to be known as Santa Clara College until 1912, making it the oldest institution of higher learning in the west. In 1857 the degree of A. B. was conferred on Thomas I. Bergin, the first to receive that degree in a California college.

During the subsequent years the College grew in influence and attendance. Several large new buildings were added, and for many years Santa Clara College, in both equipment and scholastic standing, ranked as the leading educational institution in the West. In its sixty years of existence as a college over seven thousand students were matriculated, and nearly five hundred were graduated.

The University. In 1907 lectures were commenced with a view of preparing students to enter upon the professional courses in law, medicine and engineering. In 1911, the pre-medical course was established and the law school begun. Realizing, therefore, that the College was practically doing the work of a University, the President, Father James P. Morrissey, S. J., and the Board of Trustees, adopted officially the name of "The University of Santa Clara", this decision going into effect on April 29, 1912.

In the summer of 1912, engineers of high standing were engaged to carry on the courses in engineering, and in the next summer a thoroughly equipped laboratory for engineering was prepared. In the same year the amount of work required of law students was increased and the classes in Law were thenceforth held at night.

The outbreak of the War suspended the plans for expansion and it was not until after its close that they were resumed. In 1923 an extensive building program was commenced, with a view to provide an adequate material basis for the University, and during the following years there has been added a group of new buildings, including Alumni Science Hall, 1923; Montgomery Laboratories, Seifert Gymnasium, Kenna Hall and the Service Building, 1924; Donohoe Infirmary, 1925; the remodeling of the Auditorium in 1926 and the authorization of the University Library: Nobili Hall, and the Ricard Memorial Observatory.

Accompanying the Building Program there has come a corresponding growth in attendance and scholastic work. In 1923 the Pre-Medical course was restored, and a four years College of Business Administration added. In 1925 the Institute of Law was increased to four years; steps taken towards the establishment of a School of Education; and the Preparatory Department transferred to a separate campus on the former property of the College of the Pacific, at College Park, San Jose. In 1926 the University celebrates its Diamond Jubilee and with enlarged facilities and equipment has entered upon a program of greater service to Church and state.

SYSTEM OF EDUCATION

The Jesuit system of education aims at developing side by side the moral and intellectual faculties of the student, at sending forth to the world men of sound judgment, of acute and rounded intellect, of upright and manly conscience. And since men are not made better citizens by the mere acquisition of knowledge, without a guiding and controlling force, the principal faculties to be developed are the moral faculties. Moreover morality is to be taught continuously. It must be the underlying base, the vital force supporting and animating the whole organic structure of education. It must be the atmosphere the student breathes. It must suffuse with its light all that he reads, illuminating what is noble and exposing what is base, giving to the true and false their relative light and shade.

Because of its conservative system of education, its solid philosophical system and the highly specialized training required of those who qualify as professors, the University of Santa Clara is particularly prepared to train leaders of men.

Though the Catholic Religion is the Religion professed by the Faculty and by the larger number of the students, members of all religions are admitted provided they are willing for the sake of order and uniformity to conform respectfully to the religious observance of the University.

GROUNDS AND BUILDINGS

The Campus. The University occupies a well laid out campus of approximately fifteen acres facing the Alameda, on El Camino Real from San Francisco to Los Angeles—the site of the third Mission Santa Clara. The buildings are grouped in a series of quadrangles around the Mission church in accordance with the Campus Plan prepared by the University architect, Mr. John J. Donovan, which provides for a continuation of the original Mission style.

Mission Santa Clara, built in 1822, is the heart and center of the University. Part of the old adobe building is still standing, and the remainder carries out much of the original plan. In it are preserved many relics and decorations of the Franciscan days.

The Memorial Chapel was erected in 1887, during the presidency of Rev. Father Robert E. Kenna, S. J., through the generosity of alumni and friends, as a memorial to deceased students. It is used as the students' chapel.

Bergin Hall, built in 1912 to replace the old Fathers' Building destroyed by fire in 1909, is a gift to Alma Mater of her first graduate, Hon. Thomas I. Bergin, A. B. '57. It contains the administrative offices of the University, reception rooms, residence of the Fathers and Scholastics, and the Library.

O'Connor Hall, built in 1912, is the gift of Mr. and Mrs. Myles P. O'Connor. On the first floor are the class-rooms of the College of Liberal Arts and of the Institute of Law, and office of the Director of Discipline. The second and third floors contain private rooms for the upper class-men. In the basement are the co-operative bookstore, restaurant, and recreational facilities of the Associated Students; Practice Court of the Institute of Law; and the Palaeontological Museum.

The Theater, originally built in 1870 and completely reconstructed in 1926, is one of the largest theaters for amateur productions in the West and has been the scene of such notable dramatic productions as the Passion Play and the Mission Play of Santa Clara.

Alumni Science Hall, built in 1924, is the gift of the Alumni of Santa Clara and contains offices, class-rooms, laboratories, and drawing rooms of the College of Engineering; the lecture rooms and laboratories of the Departments of Biology, Chemistry and Physics; and the electrical equipment service rooms.

Robert E. Kenna Hall, erected in 1924, is dedicated to Rev. Robert Emmet Kenna, S. J., student, professor and twice president of Santa Clara College. On the first floor are the offices, class-rooms, laboratories and library of the College of Business Administration; and class rooms for the lower division classes. The two upper floors contain private rooms for the lower division students.

Montgomery Laboratories, erected in 1924, are dedicated to John J. Montgomery, "Father of Aviation", one time professor of Physics. It contains the forge, wood-working and pattern-making, materials testing, mechanical, and electrical laboratories of the College of Engineering, together with office, class room and lockers for laboratory classes.

Seifert Gymnasium, erected in 1924, is a bequest of the late Dr. George W. Seifert, B. S. '79. It houses the plunge (40x100x10), the basketball court (65x100), locker rooms for Varsity and class teams, and students' lounging room, and is the center of social life at the University.

The Service Building, erected in 1924, houses the laundry, power and heating plant, and service rooms. The second floor provides a dormitory for employees.

Donohoe Infirmary, erected in 1925, is the gift of Miss Katherine Donohoe in memory of her father and mother, James and Rose Donohoe. It is a complete small hospital, with private rooms and ward, diet kitchen, dispensary, operating room, chapel, and offices for the infirmarian and visiting physician.

The Refectory Building, a continuation and wing of the original Mission, has been remodeled to serve as the Refectory. On the first floor are the refectories for the students, Fathers, guests, faculty and employees; kitchens; and service rooms. On the second floor are private rooms for the lay faculty and graduate students, the temporary rooms of the Students' and Law libraries, and the offices of the Santa Clara and Alumni Association.

The Observatory. The equatorial telescope, seismographs, meteorological instruments, and the study of the Father in charge, are housed at present in four small buildings.

Ricard Memorial Observatory. Through the generosity of the Knights of Columbus of California and of the country at large funds have been donated and the ground broken for a new Observatory for the Astronomical, Seismological and Meteorological work of the University.

The Library: Nobili Hall. Authorization has been made and plans prepared for the first wing of the new Nobili Hall, named in honor of Father John Nobili, S. J., the first president, to house the University Library. In it stack room will be provided for 150,000 volumes, allowing for expansion; the main reading room with its mezzanine reference alcoves will afford simultaneous accommodations for two hundred readers; the faculty will have its own study room, while the periodicals will be found in another section off the main reading room.

An added unique feature will be a whole floor devoted to the many rare books possessed by the University dealing not only with literature, divinity and science, but also with the earlier history of California, and which have been treasured from Mission days; also for the many interesting relics of the early Mission.

Athletic Field. Adjacent to the campus is the Athletic Field, with three football and three baseball fields. Adjoining the Gymnasium are four tennis and four handball courts.

LABORATORIES

The laboratories of the departments of Biology, Chemistry and Physics are located on the first and third floors of the Alumni Science Hall. They are completely equipped for all lower division laboratory work and a limited amount of advanced work.

The laboratories of the College of Engineering are located in Alumni Science Hall and in the Montgomery Laboratories and provide complete laboratory facilities for engineering courses.

The Astronomical, Seismological and Meteorological laboratories are located in the Observatory group. The completion of the new Ricard Memorial Observatory, with its new equipment, will provide one of the best observatories in the west for this line of investigation.

LIBRARY FACILITIES

Pending the completion of the new Library the University libraries are arranged on a departmental basis. The Fathers' Library, in Bergin Hall, is devoted mainly to classical, literary, philosophical and ascetical subjects, and includes many rare volumes. The Students' Library, on the second floor of the Refectory, is devoted to reference and general subjects. The Law Library, also on the second floor of the Refectory, contains a selected collection of books on general and California law. In all, the libraries contain 50,000 volumes. In addition there are available the many libraries of the San Francisco Metropolitan district.

ENDOWMENT AND NEW BUILDINGS

The growth in the number of students and the work of the University has made it imperative that adequate buildings and endowment be provided. For this, and in order that Santa Clara may widen its scope as an educational institution of recognized standing, funds are necessary. Santa Clara stands in imperative need of an endowment. The work the University has accomplished in the past is an earnest of what she will do when increased facilities are afforded her.

An endowment, however, implies a founder or founders and benefactors. During the past few years, many have helped the University and generous donations have been made. The Donohoe Infirmary; Bergin, O'Connor, and Alumni Science Halls; Seifert Gymnasium and Ricard Memorial Observatory are an inspiring example of such support.

But before other buildings, for which the plans of the University provide, may be added, further benefactions will be needed. Other institutions, even those state-aided and richly endowed, receive generous assistance in their work and hesitate not to ask it. Santa Clara feels that generous friends are not lacking, though for the want of deeper thought on the matter, few realize the importance of Christian educational work, the immense sacrifice it entails, and the merit there is in co-operating and sharing with Christian educators in their work for God and country and the welfare of the young men of our generation.

The Jesuit Faculty of the University has given its life-services freely and gladly to the work. Those who would share with them in this great enterprise can do so most effectively by rendering material aid and contributing funds for the continuance and development of the work.

FORM OF BEQUEST

I give and bequeath unto the President and the Board of Trustees of Santa Clara College, a corporation duly incorporated under the laws of the State of California, a sum of.....dollars.

SCHOLARSHIPS

Every year deserving young men of high character and aspirations, whose means do not permit their attending the University, appeal to the Faculty for assistance to obtain the education for which their talents and vocation fit them. There is scarcely a university in the United States, which is not provided with a fund for this purpose, and a relatively large percent of successful college men spring from the class of assisted students. To contribute to such a purpose is clearly a noble benefaction. But this is especially so with regard to those who apply for help to the University of Santa Clara. They are as a rule young men of high standing, who understand the paramount value of an education in a university which aims at the highest intellectual development of the student, while devoting no less attention to the perfect development of his moral character. As a consequence, to assist them in attaining their desire is to aid picked young men whose future is more than ordinarily full of promise, and who are destined to exert a most powerful influence on those among whom their lives will be spent.

Through the generosity of friends of the University a few such scholarships have recently been established, but there is need for many additional scholarships, either through permanent endowment or by annual gifts.

STUDENT ORGANIZATIONS

College life must include the development of the social side of every student's character. Marked initiative and leadership in organized religious and social movements for the common welfare of his fellows, are qualities expected of college men generally. For this purpose the University student organizations and activities furnish splendid opportunity.

RELIGIOUS ACTIVITIES

As the first thought of the University is the encouragement of a sound religious life on the part of the student body special attention is given to those sodalities and religious organizations sponsored by the Church, some of which have existed at Santa Clara for nearly three quarters of a century.

Sodality of the Immaculate Conception. Its object is to promote in its members a special and filial devotion to the Immaculate Mother of God, to imitate her virtues, to encourage, both by word and example, an eminent purity of morals and a manly fidelity to the practice of religion.

The League of the Sacred Heart. The object of this Association is to foster in the students an earnest religious spirit, particularly a deep and tender love towards our Lord in the Sacrament of His Love, and a consequent reparation for the offenses committed against Him. To this end the First Friday Communion is zealously encouraged.

The Saint John Berchmans' Sanctuary Society. This society has as members those students who as a reward for good conduct and exact application to their studies have been allowed to serve at Mass and assist at the other services in the College chapel.

Holy Name Society. The purpose of this society is the public manifestation of belief in the Divinity of our Lord Jesus Christ.

DRAMATICS

An exceptionally high standard of dramatics has been set at Santa Clara from the beginning. Earliest records show that classical productions were quite the accepted thing even in the fifties, nor have traditions changed. In consequence of this students acquire a rare facility of expression and unusual ease in public appearances.

Each year a major dramatic production is staged, giving opportunity to a large proportion of the student body to participate. In the past these productions have included such notable performances as "The Mission Play of Santa Clara" and "The Light Eternal" by Martin V. Merle '06, and "The Passion Play of Santa Clara", and "The Weaver of Tarsus" by Clay M. Greene '69.

DEBATING

The standard of debating is on a par with that of dramatics. In addition to the various debating societies inter-collegiate debates are arranged each year with representative colleges and universities.

The Literary Congress held its first meeting on February 22, 1857, and has since then furnished its members an opportunity for exercise in debating and other forms of public speaking. It consists of two Houses, the Senate and the House of Philhistorians.

The Stephen M. White Debating Society, established October 14, 1922, has for its object the fostering of debating and public speaking among Freshmen in the College of Liberal Arts.

MUSIC

The University Band and Orchestra furnish their members with the opportunity for ensemble playing at the public exercises of the University.

The University Choir and Glee Club furnish vocal music for Chapel services and the public exercises of the University.

ATHLETICS

Athletics at Santa Clara are under faculty control through the Board of Athletic Control and the Faculty Moderator, which make arrangements for inter-collegiate and intra-mural contests.

In direct charge of Athletics and Physical Training is the Director of Physical Education, who is assisted by professional coaches in the various major activities.

Block S. C. Society. Members of the University teams who have secured the University letter are organized into the Block S. C. Society in recognition of their athletic ability and for the encouragement of a high standard of athletic conduct.

The Athletic Managers Association is composed of volunteers from each class who cooperate with the management in the conduct of games and the care of equipment.

ALUMNI ASSOCIATION

The object of the association is to strengthen and perpetuate college friendships, to preserve in former students a warm regard for Alma Mater and a lively memory of the substantial benefits she has bestowed, to cherish and advance her interests, to maintain her honor and sustain her reputation by manly and honorable conduct.

Officers of the Association for 1926 are:

Francis M. Heffernan, President.
Dr. Joseph M. Toner, Vice-President.
Danilo Tadich, Secretary.
John I. Irilarry, Treasurer.

PUBLICATIONS

The Santa Clara. The Santa Clara is the official semi-monthly newspaper of the University. The aim of The Santa Clara is: to publish the news of the University, to aid in constructive work, and to afford the students of Journalism an opportunity for actual practice in newspaper editing, managing and make-up.

The Redwood. The Redwood is the University annual published by the students to serve as a medium for literary work of more than passing merit, as a record of University activities, and as an expression of the student life of the University.

The Press Club. Students interested in Journalism are organized into the Press Club, for the purpose of better fitting them for Journalistic work, and also to form a medium for presenting University news to the newspapers of the state.

ASSOCIATED STUDENTS OF THE UNIVERSITY

The Associated Students of the University is the student body organized for the encouragement of student activities, particularly Athletics, and such other work as may be recommended by the Faculty.

DEPARTMENTAL CLUBS

Each department of the University has its own organization for the study of technical problems and for the encouragement of social life among the students of the department.

The Engineering Society. This is an organization made up of students in the College of Engineering with the object of familiarizing them with the conduct of meetings of public bodies and the acquisition of ease in public speaking. Lectures to the engineering students are given before this body.

The Business Administration Association. This is an organization of students in the College of Business Administration for the study of business problems and for the encouragement of social activities among the students of the College. Frequent lectures are given before the Association by business men of prominence.

Mendel Club. This is an association of students in the Pre-Medical Department for the study of scientific subjects and the encouragement of such activities as are of particular interest to the students of this department.

Legal Fraternity. This is an organization of students in the College of Law for the discussion of legal subjects, for the encouragement of social activities among the students of Law, and for the upbuilding of the Law work of the University.

EXPENSES

Resident Students

Matriculation Fee, paid at entrance	$ 15.00
Tuition, Board and Lodging, per semester	300.00
Student Body Fee, per semester	5.00
Gymnasium Fee, per semester	5.00
Library Fee, per semester	2.50
Deposit for Books:	
By Law Students, per semester	35.00
By Engineering Students, per semester	20.00
By other students	15.00
Deposit for Laundry	20.00
Private Room, per semester	50.00
Room Deposit	10.00

Non-Resident Students

Matriculation Fee	$ 5.00
Tuition, per semester	60.00
Student Body Fee, per semester	5.00
Gymnasium Fee, per semester	5.00
Library Fee, per semester	2.50
Dinner (if desired), per semester	50.00

Special Charges

For registration after opening day of semester	$ 1.00
For each examination taken out of time or to remove a condition	2.00
For course in Subject "A", each time	5.00
For each syllabus (synopsis of semester's work in any subject furnished by the teacher)	1.00
For each copy of student's record other than the first	2.00
Instruction in music, per semester	40.00
Laboratories:	
Physics and Chemistry, per semester	12.50
Premedical, Freshman, per semester	25.00
Premedical, Sophomore, per semester	37.50
Engineering, Freshman, per semester	12.50
Engineering, Sophomore, per semester	20.00
Engineering, Junior and Senior, per semester	25.00
A deposit in all laboratories against breakage, per semester	5.00
Diplomas and Certificates:	
Junior Certificate	5.00
Degrees and Other Certificates	10.00

Pocket Money and Incidentals

The amount of pocket money and money for incidentals is left entirely to parents and guardians. The University prefers that parents deal directly with the students. Should, however, parents or guardians wish the Treasurer of the University to look after these matters, they must deposit a sufficient amount with him and instruct him how the money is to be used. The University does not advance money for these purposes.

Infirmary Charges

No charges are made for the ordinary attendance of the University Physician. Medicines are charged at cost prices. For a room in the Infirmary, a dollar a day is charged.

Payments

All Charges Must be Paid Half-Yearly in Advance. Remittances should be made in the name of the University of Santa Clara. If payment is deferred without a satisfactory understanding with the President, the latter is directed by the Trustees to remove the student in question from the institution. Semester bills and unpaid balances are subject to sight draft ten days after the bill is rendered.

It is distinctly understood that no student is entitled to take any semester examination or receive any diploma or degree or be furnished with a record of his credits while any bills due the University remain unpaid.

When a pupil is withdrawn temporarily or permanently from the University the President must be directly informed, and money supplied for traveling expenses.

Articles to be Brought

The articles which every student coming to reside at the University should bring with him are, more or less: two blankets, two counterpanes, a sufficient number of shirts, drawers, handkerchiefs, socks, shoes, napkins, towels, combs, brushes. These must be all marked distinctly with the student's name before he registers.

Opportunities for Self Help

Owing to the scholastic requirements of the University and the limited opportunities for profitable employment students entering the University should be provided with sufficient funds to meet the major portion of their expenses. For worthy students of high scholastic standing there are available, to those who have been in residence one year or more, a limited number of University positions whereby they can earn a part of their expenses. All students, whether employed or not, must meet the same standards.

SCHOLARSHIPS

The Alice Phelan Sullivan Memorial Scholarship

This perpetual scholarship for a resident student was founded in 1912 by the gift of $12,500 from "A Friend" in memory of Mrs. Alice Phelan Sullivan of San Francisco.

The Jesse W. Bryan Memorial Scholarship

This perpetual scholarship for a resident student was founded in 1913 by the gift of $12,500 by Mrs. Sarah A. Bryan, in memory of her son, Mr. Jesse W. Bryan, a former student of Santa Clara.

LOAN FUNDS

The following loan funds are open to students of the University under such conditions as may be provided by the President.

Filipello-de Saisset Loan Fund. A loan fund of $1,500.00, established in 1925 by Mrs. Doctor E. A. Filipello and Miss Isabel Saisset.

Alumni Loan Fund. A loan fund of $500.00, established in 1925 by the Alumni of the University.

Knights of Columbus Loan Fund. A loan fund of $300.00 annually, established in 1925 by the State Education Committee of the Knights of Columbus of California.

PRIZES

Ordinary prizes are awarded in all classes and in all subjects, to the students who are first and second in merit. Students whose yearly average is 85 per cent or over are given distinction. No student is eligible for a prize who has not been present for the whole year.

The following extraordinary prizes are open to competition on the dates announced in the University Calendar. The Faculty Committee of Scholarship and Standing reserves the right not to award any of these prizes in the absence of sufficient competition or a meritorious grade of scholarship. No one is eligible to compete a second time for a prize which he has already won, except after an interval of one year. Students who have not been in attendance for both semesters may not compete.

Nobili Prize

An annual prize of $60 founded by Joseph A. Donohoe, Esq., in honor of the First President of Santa Clara, Fr. John Nobili, S. J., to be given to the student in University Courses who shall be deemed first in morals, obedience and in application to study.

The Archbishop's Medal

An annual prize of $50.00, the gift of His Grace, Most Rev. Edward J. Hanna, D. D., Archbishop of San Francisco, in memory of his illustrious predecessor, Most Rev. Patrick William Riordan, D. D., for the student who shall have competed most successfully in an examination in Christian Doctrine.

The Ryland Prizes

The Hon. Caius T. Ryland founded in 1897, an annual purse of $45.00, leaving its matter to the discretion of the faculty. This the Faculty, after due consideration, assigned to the University Literary Congress, organized February 22, 1857, establishing the Ryland Debate to be held yearly between the two branches, the Senate and the House, and divided the purse into three prizes of $20.00, $15.00 and $10.00, respectively. By an agreement between these societies, each in turn selects the question to be debated, and to the other is granted the choice of the side it will defend.

The McCann Prize

Annual prize of $15.00 founded in honor of Daniel B. McCann, B. S. '84, to be given for the best short story.

The Redwood Prize

Annual prize of $15.00 founded in 1908 by the executive committee of "The Redwood," and given for the best essay on an historical subject.

The Owl Prize

An annual prize of $25.00 founded by the directors of the former College Magazine, "The Owl," to be given to the winner of the oratorical contest in the University.

The William H. Leahy Prize

Annual prizes of $50.00 and $35.00, the gift of Mr. William H. Leahy, to be given for the best dramatic composition.

The Orella Prize

An annual prize of $25.00, the gift of Dr. Firmin R. Orella, B. S. '89, to be given to the writer of the best paper on a scientific subject.

The Dramatic Art Prize

A valuable gold watch and chain, offered by friends who wish to remain unknown, to be given to the winner of the Dramatic Art Contest.

Herman Budde Prize

A prize of $25.00 for the best essay on a selected subject. Subject for 1925-26, "The need of a Catholic Daily Paper, its policy, and best plan for success in news, financing, advertising and circulation." Open to all undergraduates.

Two Silver Medals to be given to the following students who become most distinguished for good conduct and application to study:

1. The most distinguished **Resident University** student.
2. The most distinguished **Non-Resident University** student.

ADMISSION

General Statement

Application for admission, accompanied by scholastic credentials and testimonials of character, should be filed with the Registrar on or before August 1st. It is obligatory to submit on entrance official records from the school last previously attended, together with a transcript of record of all previous High School and College credentials. These credentials are to be forwarded directly by the proper officer of the school last attended and not through the student.

Testimonials

All applicants for admission must present satisfactory evidence of good moral character and a certificate of honorable dismissal from the school last attended. In case of an intermission of study immediately preceding registration the testimonial of good character should come from some responsible person who has been in a position to know the habits of the applicant during that time. Moreover, all applicants must at the time of registration submit the names of three persons to whom the Faculty may refer for further information regarding their character. The certificate of honorable dismissal from the school last attended should be accompanied by a letter from the principal certifying to the fitness of the candidate for successful college work.

No application for admission will be given consideration until the testimonials herein provided for have been offered.

Scholarship Credentials

Candidates for admission to any of the undergraduate courses of the University must qualify:

(a) For admission to Freshman standing:

1. By evidence of the completion of the regular four-year high school course of the Preparatory Department of this University or of a similar course in an approved high school or,

2. By passing an examination in subjects equivalent to fifteen standard high school units. The subjects to be presented must be arranged in advance with the University.

(b) For admission to the undergraduate course of his choice. The following are the prescribed entrance units for the respective degrees offered by the University in its various courses:

	A.B.	Ph.B.	B.C.S.	B.S.*	LL.B.	Pre-Med.
English	3	3	3	3	3	3
Latin***	4					
Foreign Language***		2	2	2	2	2
Algebra	1	1	1	1½	1	1
Geometry	1	1	1	1½	1	1
History	2	2	2	1	2	2
Laboratory Science	1	1	1	1	1	1

* Also for B.S. in C. E., M. E., or E. E.

*** Students entering with only two units of Latin for the A. B. course or without two units of foreign language for the other courses, will be given an opportunity to make up these deficient units during the first two years of college. Both units must be in the same language.

It is strongly recommended that the unprescribed units for the A. B., Ph. B. or LL. B. degrees be in Mathematics or Languages, preferably Latin; for the B. S. degrees in Sciences.

No credit is ordinarily allowed for physical education or music. One unit each may be accepted for commercial subjects, vocational subjects, and mechanical drawing.

Half units will be accepted only when presented in addition to integral units in the same subject or in half-year subjects which constitute a complete course in themselves, e. g., Solid Geometry. Any two of the biological sciences (Physiology, Botany, Zoology) may be combined into a continuous year's course equal to one unit.

The University reserves the right to require entrance examinations in the case of applicants whose certificates show grades below 80% in the prescribed units. Admission on school certificates is in all cases provisional and if, after admission, a student fails in any subject for which a school certificate was accepted, credit for that entrance subject may be cancelled.

A matriculation deficiency in a subject continued in the University in which the deficient student attains a grade above 80, may be removed by the proper faculty, on the recommendation of the professor, with the approval of the Dean of the Faculties. Students, however, are cautioned not to assume in advance that this will be done.

Examination in Subject A

All lower division entrants in the colleges at Santa Clara must at the time of their first registration in the University, take an examination, known as the Examination in Subject A, designed to test their ability to write English without gross errors in spelling, grammar, diction, sentence-structure and punctuation.

The examination in Subject A will be given within two weeks after the opening of each semester. The papers submitted in the examination will be rated as either "passed" or "not passed." Any student who is not present at the examination in Subject A which he is required to take will be rated the same as those who have not passed the examination.

All students who do not pass in the examination in Subject A will be required to take immediately after their failure, a course of instruction known as the Course in Subject A, without unit credit toward graduation. This course will be given each half year two hours a week for the semester, beginning one week after the examination. Every student who is required to take the course in Subject A will be charged a fee of $5 and the charge will be repeated each time he takes the course.

Admission to Advanced Standing

Admission to advanced standing is by specific action of the Committee on Credentials and Registration, which will evaluate all credits presented and determine the rating of the candidate.

Students from other institutions of recognized collegiate rank, including Junior Colleges with well-established courses, may be admitted to such standing and upon such terms as the Committee shall deem equitable. Every such candidate is required besides the prescribed testimonials of character and scholarship, to present a catalogue of the institution in which he has studied, and a full statement, duly certified, of the subjects he has therein completed and of the subjects there presented for entrance. The University reserves the right to determine after a test of at least one semester, the amount of credit that the applicant may receive and meanwhile he shall have the status of an unclassified student.

Admission of Special Students

Candidates for admission as special students must be persons of mature age who desire to take up special work in one department or in one subject with its related branches. Such special students are not candidates for a degree, but they may become candidates by satisfying the requirements for a regular course. No one will be admitted directly from a secondary school to the status of a special student. Entrance examinations in the subjects of fundamental importance for the work proposed will be assigned in practically all cases. Registration as a special student is for one semester only and no one may register for less than ten hours. Re-registration will be refused if the student has not shown earnestness and definiteness of purpose or if his work has been unsatisfactory in whole or in part.

Admission of Foreign Students

Candidates for admission who come from foreign countries must present original and complete educational credentials, together with a catalogue giving full description of the courses. Provisional registration may be then given pending verification of the record and until the student concerned has successfully completed one semester's work of not less than twelve hours, when permanent matriculation may be given. Students from other than English-speaking countries must, in addition, possess sufficient knowledge of English to carry satisfactorily their class work.

RELIGIOUS TRAINING

To cultivate the heart, no less than to develop the intellectual and physical faculties of the student, is a duty kept constantly and sacredly in view.

As the Faculty of the University profess the Catholic religion, the exercises of religious worship are Catholic; but members of any religious denomination are received, provided they be willing, for the sake of order and uniformity, to conform respectfully to the religious observances of the University.

The University authorities are convinced that without religion there can be no education in the truest sense of the word, that is to say, no complete and harmonious development of the intellect and heart of man. They hold furthermore, that religious truth, being definite and certain, may be taught with as much exactness as language or any other branch. Accordingly the study of Christian Doctrine is required of every Catholic student, and two periods weekly are devoted to it in every class of every course. One unit per semester is allowed for this work.

STUDENTS' HEALTH SERVICE

The University exercises supervision over the health of students. Though a certain degree of sickness is inevitable among so many, its percentage is very slight. A physician is in daily attendance at the University without extra charge for minor cases. A certificate of health, either from the home or from the resident physician, is required of each student. Wholesome food, regular hours for rising and retiring, excellent climate and ample opportunity for outdoor recreation, all combine to improve the general health of the students who are registered at Santa Clara.

DISCIPLINE

Students, whose homes are not in the neighborhood, must reside within the University unless they are accompanied by their parents.

All students are subject to examination by the University physician.

Students are not permitted to have books or other publications that have not been approved by the Vice-President.

The students' correspondence is subject to the inspection and control of the President.

To hold meetings or to form clubs or societies of any kind without the consent of the President, to enter pool rooms, the habitual use of profane language, unbecoming conduct either within or without the precincts of the institution, the possession or distribution of indecent publications or pictures, intoxication, procuring or introducing intoxicating liquors, directly or indirectly, into the University, habitual idleness and violation of the rules of the University, obstinate refusal to submit to a punishment inflicted, absence from the University at night without leave from the President, avowed principles of infidelity, express contempt or ridicule of religion, are offenses which expose the offenders to dismissal or suspension, as in the judgment of the Faculty shall be deemed necessary.

It is strictly forbidden for any student or group of students to haze any other student or subject him to any personal or physical indignity or treat him in such wise as may reasonably give offense.

No student will be permitted to leave the University on visits of any length, except during Thanksgiving, Christmas and Easter vacations, if such be the wish of his parents or guardian. Parents are requested not to call their sons home at other times, except in cases of urgent necessity, as such interruptions, besides tending to prevent the acquisition of habits of concentration and persevering work, are apt to result in poor scholarship and interfere seriously with the student's entire scholastic training.

Students who, having left the University for the summer vacation, Christmas holidays, or other recesses allowed by the President, fail to be present on the day for the re-opening of class, will, by the fact of absence, be excluded from the University, or at the discretion of the Faculty from privileges until the following semester, unless parents or guardians show cause of absence which the Faculty shall consider wholly sufficient.

Promptness in reaching the University on the day fixed for the opening of classes is necessary. It is essential that parents and students understand this clearly from the beginning of their connection with the University, as promptness in returning from vacation and recesses, which is requisite in order to prevent the loss of valuable time and the forming of habits of procrastination and negligence of duty, is strictly insisted on.

The University reserves the right to dismiss at any time a student who fails to give satisfactory evidence of earnestness of purpose and of interest, primarily in the serious work of college life. Dismissal may be made without specific charges and, in rare cases, perhaps on grounds that seem insufficient to students or parents. The University in these cases holds itself to be the more capable judge of what affects the interests of the institution and the student body.

Eligibility Rules

Except where otherwise specifically provided for by the Faculty, students taking part in public debates, oratorical or elocution contests or representing any department of the University in intercollegiate athletic events, as well as all those who are appointed on the staff of the University publications or as officers of student organizations, are subject, at the time of their selection or appointment, to the following eligibility rules: (1) They must have no conditions or failures; (2) They must have attained a satisfactory grade in conduct and application during the preceding month and a weighted average of at least 75% in the last monthly or semester examinations; (3) They must not be under censure.

Any student admitted to the University on a scholarship or as a student-worker, who fails to obtain a semester average of 75% in any of his subjects forfeits his position or scholarship.

The registration of a student is deemed a recognition on his part and on the part of his parents or guardians of compliance with all the rules and regulations of the University, and acceptance of all conditions laid down in the catalogue.

Registration Card

Before registering for instruction in any department, the student must obtain a card signed by the Treasurer of the University, showing that a satisfactory settlement of his account has been made. This card is handed to the Director of Studies from whom the student must obtain another blank, write thereon the subjects elected and approved, and present it to his professors for their signature. This registration card is then returned to the Director of Studies, to be filed in his office.

SCHOLARSHIP

No student is eligible to enter any examination, written or oral, nor is he entitled to credit, unless he has been in attendance at 80 per cent of his classes, but students in the Institute of Law must have been present at 90 per cent of the classes. Absence caused by sickness will not excuse a student from the operation of this rule.

Written Work

The following written work is required of the students, in all the classes indicated:

In the course of Philosophy and Political Economy all upper division students must write and deliver to their professor every month an essay of not less than 1500 words, on a subject selected by him from the matter lately studied.

In all classes of Mathematics, three groups of problems are to be set weekly.

In all classes of English, a composition, essay, or poem, and two written exercises in addition, are to be given in weekly by the students.

In all classes of Modern Languages, there shall be as many written exercises as there are classes.

In classes of Latin and Greek three themes are to be handed in each week.

All of these out-of-class exercises will be corrected by the teacher, either in class or out of it, and returned to the students.

Written Examinations

Written examinations are held monthly in all subjects and in all departments. They are also held twice a year upon the work done during the preceding semester.

Oral Examinations

At the end of the scholastic year:

1. All candidates for the Junior Certificate in any department will be examined in such subjects as shall be prescribed by the Dean of the Faculties and which are requirements for their Junior Certificate.

2. Students who have followed the course in Elementary Law for one semester or more will be examined therein.

3. All students, regular or special, who have followed the courses in Philosophy and Political Economy, or any part thereof, in the upper division of any college will be examined therein.

No student will be orally examined unless he has passed satisfactorily all the written examinations given at the end of each semester on the matter therein, or having been conditioned in the first semester examination, has removed the condition nor unless, in addition to the preceding requirement, he has received a passing grade on the whole year's work in every subject studied.

The examination must extend to all the work done during both semesters in the subjects indicated; but if the student was present during only one semester, the examination covers the work of that semester only.

The examination is to be conducted privately before a board of the Faculty who may increase the time allotted to any examination if they see fit. It does not determine the grade of a student's standing, but neither promotion nor credit is given without a successful examination.

Promotions

A student to be promoted in any subject must have attained an average of at least 70 per cent on the whole year's work in that subject.

This average is computed as follows, (all subjects being marked on the basis of 100 for perfect work):

For the monthly mark, class-work counts two-thirds and the monthly examination one-third;

For the semester mark, the sum of five monthly marks counts two-thirds and the semester examination one-third;

For the year's mark, the sum of the marks for the first and second semester is to be divided by two.

Where an oral examination is required the student is not promoted or graduated unless he attains therein a passing mark of 70.

Special regulations as to the grades to be maintained by law students, candidates for degrees and certificates, will be found under "Institute of Law, Graduation."

Conditions

A mark of 60 to 70 at the end of a semester indicates a condition. A student who is conditioned in two subjects may be excluded from the University, but without prejudice to his continuing his studies at another University.

Where a student is conditioned in an examination given at the end of the first semester, he will not be re-examined until approximately two months after his failure. Unless this condition is removed upon re-examination, the student will not be admitted to the final examinations at the end of the year.

Where a student is conditioned in a written or oral examination, given at the end of the school year, he will not be re-examined until the beginning of the next school year; provided however, that where a student is conditioned in a written or oral examination given as one of the final tests before graduation, he will not be re-examined until six months after receiving the conditions.

Where a student has been re-examined in any subject to remove a condition or reach a certain average, another examination may be permitted in the discretion of the Faculty; but in no case may it be taken until two months have elapsed since the former examination. If the student fails to reach the required average no further examination will be allowed.

Any student who enters his Senior year with a condition, will have the status of a special student unless this condition is removed within one month after the opening of the first semester.

Failures

A grade of less than 60 at the close of a semester indicates a failure. A failure in a subject means that the student must repeat the work in class the next time it is given. A student who fails in two subjects may be excluded from the University.

A conditioned student who fails to pass a satisfactory examination at the time set for condition examinations, receives a failure in the subject, unless, on recommendation of his professor, the faculty shall permit him to review a subject in which he is thus deficient with the assistance of an acceptable private tutor; in which case he will be excused from attending the recitations, but will be required to take the regular examination at the end of the year or half-year.

If the condition is received in a Laboratory course, the student must make up the work in which he is deficient before the time of the condition examinations or receive a failure.

Electing Studies

All students must inform the Director of Studies in writing as to their choice of subjects, and no one may enter upon a course or relinquish one already taken up without his advice and consent, upon penalty of receiving no credit in the first case and a condition in the subject abandoned, in the second.

Candidacy for Degree or Certificate

Every person who wishes to become a candidate for a degree or certificate in any department of the University, must, not later than one month after his entrance, file with the Committee of Scholarship and Standing a written statement of the degree or certificate to which he aspires and the work which he proposes to do. He will then be informed whether he may be admitted as a candidate for such degree or certificate and whether the work proposed is satisfactory. Any change of purpose must be similarly announced and approved.

Thesis

Candidates for the junior certificate must submit an essay bearing on the matter studied in their course in English or some cognate subject. Candidates for a degree must submit a thesis on their major or some cognate subject. The thesis or essay shall consist of not fewer than 5000 words and shall be typewritten on National White unruled paper 8½x11 inches. The subject must be submitted to the Dean of the Faculties for approval not later than January 15 and the thesis itself handed in completed on the 15th of April of that same year. The presentation of an acceptable thesis is an absolute prerequisite for admission to final examination. The ultimate decision as to whether the effort merits the certificate or degree rests with the Committee on Theses.

COURSES, UNITS

Courses in the University are divided into three groups: The Lower Division, comprising the studies in the freshman and sophomore years, and leading to the junior certificate; the Upper Division, comprising the studies in the junior and senior years, and leading to the Bachelor's degree; and Graduate Courses, comprising graduate studies, and leading to advanced degrees.

Courses in the Lower Division are numbered from 1 to 100, and are marked COURSES FOR UNDERGRADUATES. Courses in the Upper Division are numbered from 101 to 200, and are marked COURSES FOR ADVANCED UNDERGRADUATES AND GRADUATES. Courses for Graduate students are numbered from 201 up. Under certain conditions Lower Division courses may be taken for Upper Division credit, but in such cases it is expected that a higher standard of work shall be done and the instructor will assign additional work for such students. Upper Division subjects may be taken for Graduate credit under such conditions as may be prescribed by the Dean of the Faculties and the Professor in charge.

Each unit or credit represents one hour of the student's time at the University weekly during one-half year, in lecture or recitation, together with the time necessary in preparation therefor, or a longer time in laboratory or other exercises not requiring preparation. Ordinarily a student is expected to spend at least two hours of preparation for each hour of recitation.

No student, except when specifically provided in his course, may register for more than sixteen hours exclusive of the courses in Religion, without special permission of the Faculty and such registration is not allowed to any student in his first semester of residence. After one semester of regular work, students beyond freshman, may receive permission to take not more than eighteen units per semester, provided they have attained a weighted average of at least 80% the preceding semester. On the other hand, students carrying more than the normal amount of work who fail to maintain a standard of 75% in all their courses, may be restricted by the Dean to the normal number of units. Even if, because of the difficulty of making the desirable courses total the exact limit, a student is permitted to carry a study-list slightly greater than the limits here set, or if a student transfers from another college where a greater study-list is permitted or required, the credit towards the degree will be limited strictly according to this rule.

RECOMMENDATIONS TO OTHER SCHOOLS

No student will be recommended for entrance into any other University or College who has not maintained an average of 85% in every subject throughout his course.

Students wishing Transcripts of Record in order to transfer to another school or for any other purpose should make early and seasonable application for the same. No such statements will be made out during the busy periods of examination and registration. Credentials which are accepted for admission become the property of the University and are kept permanently on file.

SESSIONS

The first semester begins about the middle of August and ends about December 20th.

The second semester begins about January 3rd and ends about May 30th.

As in most departments of the University, new courses are not begun in January, students desiring to matriculate at the beginning of the second semester can only be received on condition that they are prepared up to the point then reached by the class which they desire to enter.

COLLEGE OF LIBERAL ARTS

FACULTY
COLLEGE OF LIBERAL ARTS

Zacheus Joseph Maher, S. J., A. M.
President

John Aloysius Lennon, S. J., A. M.
Dean

Cornelius Joseph McCoy, S. J., A. M.
Director of Discipline

Eugene Michael Bacigalupi, S. J., A. M.
Professor of Physics

Albert. M. Casey, S. J., A. M.
Professor of Philosophy

Arthur Vincent Coghlan, S. J., A. M.
Professor of English, Latin and Religion

Cornelius Francis Deeney, S. J., A. M., Ph. D.
Professor of Political Economy and Sociology

Peter M. Dunne, S. J., A. M.
Professor of Education, History and Religion

Joseph Robert Fernandez
Professor of Spanish

Cornelius Hagerty, B. S.
Professor of Biology and Organic Chemistry

James J. Kelly, S. J., A. M.
Professor of Chemistry and Mathematics

Henry Lecat, Brev. Sup., Paris
Professor of French

Peter John Mootz, S. J., A. M.
Professor of Philosophy and Religion

Edward Preston Murphy
Professor of German

Aloysius Roccati, S. J., A. M.
Professor of Italian

Ronald G. Stewart, A. B., J. D.
Professor of Elementary Law

Daniel E. Sullivan, LL. B., LL. M.
Professor of Public Speaking

Ernest P. Watson, S. J., A. M.
Professor of Mathematics and Latin

Henry Woods, S. J., Ph. D.
Professor of Ethics and Literature

GRADUATE DEPARTMENT

The graduate department offers students who have attained academic degrees studies leading to the Master's or Doctor's degree. The determination of these courses rests with the Committee on Post-Graduate Studies. A sufficiently wide option is allowed, much of the instruction being in the form of direction along lines of original research. Courses may be had in the Classics, English and Public Speaking, History, Mathematics, Modern Language, Philosophy, Political and Social Sciences, Law and Engineering.

In the graduate division residence at any place or in any field, which may be designated by the Dean of the Faculties as suitable for the work of a candidate for one of the advanced degrees is regarded as a residence at the University.

ADMISSION TO GRADUATE STANDING

The minimum requirements for graduate standing are fulfilled by graduates of colleges and universities of recognized grading, whose credentials evidence ability and promise, and who expect to become candidates for advanced degrees or who purpose to pursue regular advanced professional or research courses. In all cases evidence of the Bachelor's diploma must be presented along with a certified copy of the applicant's complete scholastic record. Admission to the graduate department does not of itself imply admission to candidacy for a higher degree. The grade of work which graduate students may elect and their standing will depend upon the extent and character of their undergraduate courses.

DEGREES

For the degree of Master of Arts (A. M.), the candidate must have an A. B. degree and must devote one year exclusively to resident graduate study, completing at least twenty-four semester hours. He must, moreover, pass a satisfactory examination, both written and oral, in all the subjects studied and he must present a typewritten or printed thesis in his major subject at least four weeks before the date fixed for the annual conferring of degrees. The ultimate decision as to whether the thesis merits the degree rests with the Committee on Theses.

For the degree of Master of Science (M. S.), the same conditions must be fulfilled as for the degree of Master of Arts, provided the candidate has a B. S. degree and his major subject has been scientific.

For the degrees of Civil Engineer (C. E.), Electrical Engineer (E. E.), and Mechanical Engineer (M. E.), it is required that the candidate be a graduate in the College of Engineering of this University who has been engaged in acceptable professional work for a period of not less than three years after receiving the Bachelor's degree. Candidates for these degrees must declare their candidacy and file with the Dean of the College of Engineering a detailed statement covering their professional study and experience and an outline of their proposed thesis not later than December 31st preceding the commencement at which they wish to receive the degree, and they must submit the completed thesis not later than one month prior to the date fixed for the annual conferring of degrees.

For the degrees of Doctor of Laws (J. D.), the candidate must in addition to completing all the work prescribed for the LL. B. degree complete, under conditions similar to those outlined for the A. M. degree, the courses set forth in the catalogue in Roman Law, International Law and the History of English Law.

For the degree of Doctor of Philosophy (Ph. D.), the candidate must complete not less than three years of graduate work in pursuance of an accepted course of study. The course in question must include one principal and one or two secondary subjects. A reading knowledge of French or German (and of Latin for those electing Scholastic Philosophy as their major course), is a prerequisite. Moreover, the candidate must pass a satisfactory examination, both written and oral, on the work done and present a satisfactory thesis.

No degree in the graduate department will be conferred unless the candidate present himself in person at the commencement at which the degree is awarded.

COLLEGE OF LIBERAL ARTS

DEGREES

The College of Liberal Arts offers courses leading to the degrees of Bachelor of Arts (B. A.); Bachelor of Philosophy (Ph. B.); and Bachelor of Science (B. S.).

For students completing the prescribed work of the Freshman and Sophomore years there is conferred the Junior Certificate.

COURSES

Philosophy and Letters. The curriculum of Philosophy and Letters extends over four years and comprises courses of study selected with special regard to their cultural value, but which, far from being of merely cultural importance, afford the most solid foundation for the learned professions and for those larger commercial pursuits characteristic of the present age, which demand intellects carefully trained by the most efficient instruments available. To those students who, in addition to other prescribed studies, present a minimum of six years of Latin the degree of Bachelor of Arts is awarded. Students whose preparatory training in the classics was not sufficient to warrant their matriculation for the degree of Bachelor of Arts or who fail to offer the six years minimum requirement of Latin will be awarded the degree of Bachelor of Philosophy.

General Science. The curriculum of General Science likewise extends over four years and leads to the degree of Bachelor of Science. With the exception of the classical languages and literature for which modern languages and literature are substituted, this course contains all the strong studies of the curriculum of Philosophy and Letters and in addition offers supplementary courses in Biology, Chemistry, Mathematics, Physics and other scientific subjects.

Education. For students preparing to teach either in High School or College courses are offered in the History and Theory of Education, which, with their prescribed and specialized courses in other departments, give the necessary technical preparation for such work.

Pre-Medical. This course, extending over two years, is designed to comply with the requirements of the best medical schools in the United States, and to give the student a preliminary laboratory training which will familiarize him with future work. Students so desiring may extend this course to cover the four years of General Science, leading to the degree of Bachelor of Science.

DIVISIONS OF THE COLLEGE

The College recognizes a lower and upper division. The work of the lower division comprises the studies of the freshman and sophomore years and on its successful completion the junior certificate is awarded. Its attainment is a prerequisite for admission to the upper division. For any degree a minimum of 128 units is required, 64 of which the student will normally take in the lower division and 64 in the upper. Each unit represents one hour of the student's time at the University weekly, during one-half year, in lecture or recitation, together with the time necessary in preparation therefor, or a longer time in laboratory or other exercises not requiring preparation.

No student may register for more than sixteen hours (outside of Religion) without special permission of the Faculty and such registration is not allowed to any student in his first semester of residence. After one semester of regular work, students beyond freshman, may receive permission to take not more than eighteen units per semester, provided they have attained a weighted average of at least 80% the preceding semester. On the other hand, students carrying more than the normal amount of work who fail to maintain a standard of 75% in all their courses, may be restricted by the Dean to the normal number of units. Even if, because of the difficulty of making the desirable courses total the exact limit, a student is permitted to carry a study-list slightly greater than the limits here set, or if a student transfers from another college where a greater study-list is permitted or required, the credit towards the degree will be limited according to this rule.

Honorable mention will be granted with the junior certificate to students who attain an 80-90 grade in 45 units.

LOWER DIVISION

In the lower division it is expected that the student, in addition to fulfilling the prerequisites for the major work upon which he will concentrate in the upper division, will make an effort to establish a basis for that breadth of culture which will give him a realization of the methods and results of some of the more important types of intellectual endeavor, and a mental perspective that will aid him in reaching sound judgments. The junior certificate requirements were designed to provide in some measure for the accomplishment of this purpose, without unduly limiting the student's opportunity to satisfy his individual tastes and preferences.

Certain courses taken in the high school are accepted as fulfilling in part or in whole some of these junior certificate requirements. It is desirable that the student should so arrange his high school programme as to reduce the required work in the fields of foreign languages, mathematics and the natural sciences. This makes his programme more flexible, gives him greater freedom of choice, and prepares him to pass more quickly into advanced work or into new fields of study. In no case, however, does the satisfaction of junior certificate requirements in the high school reduce the amount of work required in the university for the junior certificate or for the degree. The junior certificate will be granted on the completion of not less than 64 units of college work and the fulfillment, presupposing the prescribed entrance requirements and the successful completion of Subject "A", of the requirements specified in the respective courses.

Students who on finishing Freshman will not have had 12 units of natural science, including their high school work, (one unit of which is equivalent to three college units), will be compelled to complete the science requirement.

Pre-legal Requirements are met by students following A. B. or B. S., or Ph. B. courses and substituting Elementary Law for History.

Moreover all candidates for the junior certificate must submit an essay bearing on the matter studied in their course in English or some cognate subject and consisting of not fewer than 5000 words, as provided in the general regulations. The presentation of an acceptable essay is an absolute prerequisite for admission to final examinations. The ultimate decision as to whether the effort merits the certificate rests with the Committee on Theses.

Candidates for the junior certificate must moreover pass all prescribed oral examinations provided for in the General Regulations contained in this catalogue.

SCHEDULE OF COURSES

Lower Division

FRESHMAN

First Semester

	Units Required for			
	A. B.	Ph. B.	B. S.	Pre-Med.
English 1	3	3	3	3
Public Speaking 1	1	1	1	1
Latin 1	3			
Logic (Philos. 1)	2	2	2	
Logic (Philos. 11)				3
Chemistry 1, 2	4	4		
Chemistry 11, 12			4	4
Greek*	3			
Mathematics 1 or 11			3	
Modern Language		3	3	3
Biology 1				3
History 1		3		
Religion 1	1	1	1	1

Second Semester

English 2	3	3	3	3
Public Speaking 2	1	1	1	1
Latin 2	3			
Logic (Philos. 2)	2	2	2	
Ontology (Philos. 12)				3
Chemistry 3, 4	4	4		
Chemistry 13, 14			4	4
Greek*	3			
Mathematics 13			5	
Modern Language		3	3	3
Biology 2				3
History 2		3		
Religion 2	1	1	1	1

* Students not choosing Greek may substitute Mathematics, Modern Language or History.

SCHEDULE OF COURSES

SOPHOMORE

First Semester

	Units Required for			
	A. B.	Ph. B.	B. S.	Pre-Med.
English 3	3	3	3	
Public Speaking 3	1	1		
Latin 3	3			
Philosophy 3	3	3	3	
Philosophy 13				3
Physics 1, 2		4	4	4
Greek**	3			
Mathematics 14			4	
Modern Language		3	3	3
Biology 3				4
Chemistry (Organic) 21, 22				4
History 3***	3	3		
Religion 3	1	1	1	1

Second Semester

English 4	3	3	3	
Public Speaking 4	1	1		
Latin 4	3			
Philosophy 4	3	3	3	
Philosophy 14				3
Physics 3, 4		4	4	4
Greek**	3			
Mathematics 15			4	
Modern Language		3	3	3
History 4***	3	3		
Biology 4				4
Chemistry (Organic) 23, 24				4
Religion 4	1	1	1	1

**For those who took Greek in Freshman: else Mathematics, Modern Language or History.

*** Students in combined Arts-Law course may substitute Elementary Law for History.

UPPER DIVISION

Only those students who have been granted the junior certificate, signifying their completion of lower division requirements, will be registered as regular students in the upper division.

Degree in the College of Liberal Arts will be granted upon the following conditions:

1. The total number of units in college courses in the lower and upper divisions offered for the degree must be at least 128.

2. At least 60 units of upper division subjects must be completed after the receipt of the junior certificate. Where lower division units are taken for upper division credit both the quantity and quality of such work must conform to upper division standards.

3. Candidates for graduation must complete a major of 24 upper division units, representing the required work in Philosophy, Political Economy and Sociology.

4. In addition to the prescribed major a minor of 12 upper division units must be completed in each of two other departments, one of which may represent professional courses in an approved combined course. Not more than 24 units of upper division courses in one department will be counted towards the degree.

5. Candidates for a degree must submit a thesis on their major or some cognate subject consisting of no fewer than 5000 words, as prescribed in the General Regulations. The presentation of an acceptable thesis is an absolute prerequisite for admission to final examination. The ultimate decision as to whether the effort merits the degree rests with the Committee on Theses.

6. Candidates for graduation must moreover pass all prescribed oral examinations provided for in the General Regulations.

7. Residence of at least one year immediately preceding graduation is required for the granting of any degree.

MAJORS AND MINORS

Major. A major of 24 units in Philosophy is required of all candidates for a degree, covering the following courses:

Philosophy 101, 102, 103, 104, 107.
Political Economy 101, 102.
Sociology 101.

Minor. A minor in each of two of the following departments, consisting of not less than 12 nor more than 24 units, shall be presented in addition to the major:

Classics.
Education.
English and Public Speaking.
History
Mathematics.
Modern Language.
*Law.
Political Economy.

Electives. Courses not taken as prescribed courses and not included in the student's Major and Minor sequences may be chosen as free electives to complete the 128 units required for graduation.

Additional Units. When the nature of the course permits, students taking a course as a Major or Minor, with the approval of the Dean of Faculties, may arrange to present work for additional credit in such course. Such work shall be done under the direction of the Professor in charge and in both quantity and quality shall conform to the required standard of the course.

SCHEDULE OF COURSES

Upper Division

JUNIOR

First Semester

	Units Required for		
	A. B.	Ph. B.	B. S.
Philosophy 101	3	3	3
Political Economy 101	3	3	3
Religion 101	1	1	1
Minors and Electives	9	9	9
Second Semester			
Philosophy 102	3	3	3
Political Economy 102	3	3	3
Religion 102	1	1	1
Minors and Electives	9	9	9

SENIOR

First Semester

Philosophy 103	3	3	3
Sociology 101	3	3	3
Religion 103	1	1	1
Minors and Electives	9	9	9
Second Semester			
Philosophy 104	3	3	3
Philosophy 107	3	3	3
Religion 104	1	1	1
Minors and Electives	9	9	9

* Students taking the combined Arts-Law course may present Law as a Minor, but not to exceed 24 units in all.

DESCRIPTION OF COURSES

THE CLASSICS

LATIN

Courses for Undergraduates

1. Cicero. The orations studied as models of oratorical art; rapid reading, analysis, discussion, criticism. Latin composition based on special text and matter read in class. Three hours. One semester.

Prerequisite: High School Latin. Three units.

2. Virgil—The Aeneid. After reading books VII-XII, the poem will be studied as a whole, special attention being given to the sources, to the epic technique and literary art of Virgil and to the tracing of his influence in the literature of the world. Narration and descriptive composition based chiefly on the text of the Aeneid and implying a discrimination of the vocabulary and syntax of prose and verse. Students will write three compositions weekly. Three hours. One semester.

Prerequisite: Latin 1. Three units.

3. The Latin Historians. Copious readings in Sallust, Curtius, Pliny and Livy, with critical consideration of the historical works of these writers and collateral reading directed to reach an appreciation of their place in Latin literature. Latin composition based on the Latin historians. Three hours. One semester. Three units.

4. Horace. The Odes, Books I-IV, will be read and carefully studied. Students will memorize selected odes and portions of odes. Such phases of Roman life as are suggested will be the subject of collateral reading under the direction of the professor. Latin composition. Students will be expected to show facility and elegance of diction in their written work. Three hours. One semester.

Prerequisite: Latin 2. Three units.

7. Special Latin. A rapid review of elementary Latin, including grammar, composition and rapid reading of easy passages. Intended for students with an amount of High School Latin insufficient to enter Latin 1. Hours and credits to be arranged.

Prerequisite: Latin 3. Three units.

Courses for Advanced Undergraduates and Graduates

170. Latin Seminar. This course covers whatever advanced Latin may be taken by Upper Division students, whether individually or in groups. An easy reading, writing and speaking knowledge of classical Latin is presumed. Advanced work will cover a review of the classical writers, the Latin Fathers, Mediaeval and Ecclesiastical Latin; studied as literature or in connection with work in history, philosophy and jurisprudence. Hours, courses and credits to be arranged.

GREEK

Courses for Undergraduates

1. **Elementary Greek.** The course is intended for those who enter without Greek. Grammar; simple Prose selections; composition. Three hours. First semester. Three units.

2. **Elementary Greek.** A continuation of Greek 1. Readings from Xenephon, Anabasis, with prose composition based on Xenophon. Three hours. Second semester.
Prerequisite: Greek 1. Three units.

3. **Intermediate Greek.** A continuation of the grammar, with readings and prose composition. Selected portions of the Iliad or Odyssey of Homer; Homeric Dialect; outline of Greek epic poetry. Three hours. First semester. Three units.

4. **Intermediate Greek.** A continuation of Greek 3, with special emphasis on sight reading and advanced prose composition. Three hours. Second semester.
Prerequisite: Greek 3. Three units.

Courses for Advanced Undergraduates and Graduates

170. **Seminar.** Advanced study of particular problems of Greek life, history and literature.

EDUCATION

Courses for Advanced Undergraduates and Graduates

101. **History of Ancient Education.** The educational system of Greece, Rome and Egypt; the early Christian cathedral and cloister schools; the rise of the universities; and the struggle of the Church to introduce civilization into Western Europe. It aims, particularly, to give the student a cultural back-ground and to acquaint him with those fundamental concepts of education that are a prerequisite to all criticism of purpose and methods. Two hours. First semester.
Prerequisite: Junior standing. Two units.

102. **History of Modern Education.** The history of education from the time of the Renaissance; the work of the great educational reformers; the development of national school systems in Europe and the United States. Two hours. Second semester.
Prerequisite: Education 101. Two units.

103. **Principles of Secondary Education.** This course aims to acquaint the student with the function of the secondary school as a unit in our educational system. It treats of existing types of secondary schools; the special technic of the assignment and recitation; and the problems that confront the teacher in his relations with administrative officers, parents, and pupils. Two hours. First semester.
Prerequisite: Junior standing. Two units.

104. Jesuit System of Secondary Education. A historical and critical study of the Ratio Studiorum. Among the topics treated are: the importance of instruction in morality and means of imparting it; the Jesuit ideal of a well-organized school; principles governing the selection and organization of subject-matter; the development of the power to reason, initiative, and the critical faculty; the proper use of the memory in education; the teacher's part in the recitation; the reasonable use of emulation; provision in Jesuit schools for individual differences. Two hours. Second semester.

Prerequisite: Junior Standing. Two units.

170. Seminar. Advanced work in Education and the study of special problems by class or individual direction. Hours, matter and credits to be arranged.

ENGLISH

Courses for Undergraduates

1. Argumentation and Oratory. Invention, arrangement, and development of thought; a course presenting the principles of reasoning and persuasion. Exercises in brief-making and the writing of speeches. Three themes and one longer composition are required weekly, and two speeches of considerable length during the semester. Three hours. First semester. Three units.

2. Rhetoric. Exposition and Description. The Essay. Sources and presentation of material. Essays and exercises in exposition and description. One essay and three exercises are to be done each week, and two essays of considerable length during the semester. Three hours. Second semester. Three units.

3. English Poetry. Its nature and kinds, especially the epic, the drama, the lyric. Metre and verse. Practice in verse composition of the simpler forms. Three themes and one longer composition are submitted weekly. Three hours. First semester.

Prerequisite: English 1, 2. Three units.

4. Narration. The Short Story. The Novel. Three exercises in narration each week. Three short stories during the course. Three hours. Second semester.

Prerequisite: English 1, 2. Three units.

11. Composition and Rhetoric. (For students in the College of Engineering.) The invention, arrangement, and presentation of material. The different species of historical, philosophical, scientific, critical, etc. masterpieces. Lectures and recitations. Three hours. First semester. Three units.

12. Composition and Rhetoric. (For students in the College of Engineering.) Continuation of English 11. Three hours. Second semester.

Prerequisite: English 11. Three units.

13. Rhetoric and Literature. (For students in the College of Engineering.) A course in Rhetoric and Literature. Three hours. First semester.

Prerequisite: English 12. Three units.

14. Rhetoric and Literature. (For students in the College of Engineering.) Continuation of English 13. Three hours. Second semester.

Prerequisite: English 13. Three units.

21. English Literature. A study of writers and periods in English Literature, taking a general survey of the subject, with special emphasis on particular writers or times. Lectures, recitations and assigned readings. Two hours. One semester. Two units.

Courses for Advanced Undergraduates and Graduates

101. Early English Literature. A study of the beginnings of English literature, including the Saxon, Norman and Early English periods. Lectures and recitations. Two hours. One semester. Two units.

102. Elizabethan Literature. A study of the more prominent writers during the Tudor and Stuart reigns, with special emphasis on the Elizabethan period. Lectures and recitations. Two hours. One semester. Two units.

103. Georgian Literature. English Literature from the time of Queen Anne to that of Queen Victoria. Lectures and recitations. Two hours. One semester. Two units.

104. Victorian and Modern English Literature. A study of the leading writers from the reign of Queen Victoria down to the present, including contemporary American writers. Lectures and recitations. Two hours. One semester. Two units.

170. Seminar in English Literature. A discussion of special writers or special periods in English Literature. Hours and credits to be arranged.

PUBLIC SPEAKING AND EXPRESSION

Courses for Undergraduates

1. **Fundamentals of Expression.** The fundamental principles of expression; the speaking voice; body and expressive movement. Training the voice and body to be the willing and obedient servant of the mind. Each student appears in memorized work at each class. Two hours. First semester. One unit.

2. **Fundamentals of Expression.** A continuation of course 1, with development of impersonation and interpretation. Two hours. Second semester.
Prerequisite: Public Speaking 1. One unit.

3. **Philosophy of Expression.** An advanced study of the principles of expression; advanced training of the voice; embodiment of principles in practice work. A short selected cutting of standard literature is presented by each student at each class. Special training in the interpretation of longer selections for public presentation. Two hours. First semester.
Prerequisite: Public Speaking 2. One unit.

4. **Philosophy of Expression.** A continuation of course 3, with special emphasis upon impersonation, and standard speeches. Two hours. Second semester.
Prerequisite: Public Speaking 3. One unit.

11. **Fundamentals of Expression.** A short course in expression intended primarily for students in the College of Engineering. Fundamentals of expression; the speaking voice; expressive movement; impersonation; interpretation. Each student must appear in memorized work at each class. One hour. First semester. One unit.

12. **Fundamentals of Expression.** A continuation of course 11. One hour. Second semester.
Prerequisite: Public Speaking 11. One unit.

Courses for Advanced Undergraduates and Graduates

101. **Aesthetics.** An advanced course where every principle taught in previous courses is put to practical test. Each student is required to memorize and present during the course a short play, in which he impersonates all of the different characters and interprets both the particular parts and the play as a whole. One hour. First semester.
Prerequisite: Public speaking 4. One unit.

102. **Aesthetics.** A continuation of course 101. One hour. Second semester.
Prerequisite: Public Speaking 4. One unit.

107. Dramatic Seminar. The mechanics of the theater and the staging of a play, both theory and practice. Lines: voice, body, impersonation. Business: pantomime and stage. Plots: ground, light, scenery, property. Mechanics: illusions and terminology. Criticism: Playreviewing and dramatic criticism. Hours and credits to be arranged.

109. Debating Seminar. The application of the principles of expression to the Debate. A study of the particular form of debating. Presentation and arrangement of ideas. Practical application of methods in connection with a major collegiate debate. Hours and credits to be arranged.

HISTORY

Courses for Undergraduates

1. European History: The Renaissance and the Protestant Revolution. General character of the period. The Renaissance. The Age of Charles V. The Protestant Revolution and the Catholic Revival. Three hours. First semester. Three units.

2. European History: The Catholic Revival to the French Revolution. Extent and influence of the Catholic Revival. The Wars of Religion. The Puritan Revolution. Age of Louis XIV. Wars between England and France. Rise of Prussia. Causes of the French Revolution. The French Revolution and Napoleonic era. Three hours. Second semester.

Three units.

3. European History: From the Restoration to the Franco-Prussian War. Influence of the Napoleonic era. The period of reaction. The revolutionary movement in France and Germany. Growth of democracy in England. Establishment of the German Empire. Rise of Italy. European colonial policies. The Franco-Prussian war. Three hours. First semester. Three units.

4. European History: From the Franco-Prussian War to the World War. Rise of national states: Germany, Italy, etc. Colonial expansion. Industrial development. The Russo-Japanese war. The Entente and Triple Alliance. Causes of the World War. The World War. Effects of the World War. Three hours. Second semester.

Three units.

15. Economic History of Europe. (This course is described in the College of Business Administration as B. A. 15.) A general survey of the economic development of Europe from the eleventh century to modern times, with special emphasis upon the growth and development of English industry and commerce. Three hours. First semester. Three units.

16. Economic History of the United States. (This course is described in the College of Business Administration as B. A. 16.) A study of the economic development of the United States with special reference to the labor problems arising from the rapid growth of the factory system in industry. Three hours. Second semester.

Three units.

Courses for Advanced Undergraduates and Graduates

170. Seminar. This course covers whatever advanced work in History may be taken by Upper Division students, whether individually or in groups. Students with two years work in Lower Division European History will be directed in their study along such lines of specialization as may be chosen. This work will include assigned readings; investigation of original sources; a periodic discussion of topics, either personally with the Professor or in groups; and the preparation of papers, reports and thesis. Hours, subjects and credits to be arranged.

ELEMENTARY LAW

Courses for Undergraduates

1. Elementary Law. This is an elementary course intended primarily for undergraduates in the Pre-Legal course of the College of Liberal Arts, and is a prerequisite for all advanced courses in the Institute of Law. Robinson's Elementary Law. Three hours. First semester.

Prerequisite: Sophomore standing. Three units.

2. Elementary Law. A continuation of Law 1. Three hours. Second semester.

Prerequisite: Law 1. Three units.

For additional courses in Law see Courses in the Institute of Law, and in the College of Business Administration.

MATHEMATICS

Courses for Undergraduates

3. College Algebra. A course containing the usual matter and methods of Advanced Algebra, special attention being given to graphical methods. Three hours. One semester. Three units.

11. Algebra. (A course in College Algebra intended primarily for students in the College of Engineering.) Complete Algebra to include quadratic equations; then more particularly; ratio and proportion, progressions, imaginary and complex numbers, indeterminate equations, binomial theorem, variables and limits, inequalities, interpretation of results, logarithms, permutations and combinations, undetermined coefficients, determinants and graphic algebra. Brenke's Advanced Algebra and Trigonometry. Three hours. First semester. Three units.

12. Trigonometry. Development of general formulae. Functions and their relations. Logarithms and their uses. Properties of triangles. Application of principles to practical problems in right and oblique triangles. Navigation in plane trigonometrical problems. Spherical trigonometry. Application to problems in astronomy and spherical mensuration. Brenke's Advanced Algebra and Trigonometry. Two hours. One semester.

Prerequisite: Mathematics 11. Three units.

13. Analytic Geometry. Loci. Lines. Circle. Different systems of co-ordinates. Conic sections. Supplementary proportions. Loci of second order. Plane curves of higher order. Solid analytical geometry, especially of revolution. General equations. Rigg's Analytic Geometry. Five hours. Second semester.

Prerequisite: Mathematics 11, 12. Five units.

14. Calculus. Fundamental Formulae and principles for differential and integral calculus. Maxima and minima. Curvature. Surfaces. Volumes. Intermediate forms. Envelopes. Series Expansion. Forms of integration. Practical application. Townsend and Goodenough's Calculus. Four hours. First semester.

Prerequisite: Mathematics 13. Four units.

15. Calculus. Continuation of Mathematics 14. Four hours. Second semester.

Prerequisite: Mathematics 14. Four units.

Courses for Advanced Undergraduates and Graduates

116. Differential Equations. Analysis and deduction of formulae and equations used in physics, mechanics and engineering problems. Applications of formulae and equations given in engineering handbooks to problems. Practical problems and lectures. Campbell's Differential Equations. Two hours. Second semester.

Prerequisite: Mathematics 15. Two units.

117. Method of Least Squares. Study of the principles and methods. Applications to solution of physical, astronomical, engineering and other problems. The student will be made familiar with this higher and more accurate method of solution of problems in his profession, especially triangulations. Merriman's Method of Least Squares. Two hours. Second semester.

Prerequisite: Mathematics 15. Two units.

MODERN LANGUAGES

FRENCH

Courses for Undergraduates

1. **Elementary French.** In this course the student is carefully drilled in elementary grammar up to the irregular verbs, attention also being given to acquiring a vocabulary of the more common words. Three hours. One semester. Three units.

2. **Elementary French.** A continuation of French 1. Special attention is given to the more important irregular verbs, the memorizing of words, and translation of French into English and vice versa. Three hours. One semester.
Prerequisite: French 1. Three units.

3. **Intermediate French.** A thorough review of grammar and syntax. The object of this course is to acquaint the student with the general vocabulary and enable him to read the more simple French writers. Three hours. One semester.
Prerequisite: French 2. Three units.

4. **Intermediate French.** This course continues the work begun in French 3. Regular exercises are given in written work, and copious reading is made from the standard works in order to fit the student for professional reading. Three hours. One semester.
Prerequisite: French 3. Three units.

Courses for Advanced Undergraduates and Graduates

170. **Seminar.** A study of special periods and writers in French literature, with emphasis on their literary qualities. The development of elegance in French composition and pronunciation. An easy reading, writing and conversational knowledge of French is presumed. Hours and credits to be arranged.

GERMAN

Courses for Undergraduates

1. **Elementary German.** Elements of German Grammar. Drill in pronunciation. Vocabulary. Three hours. One semester. Three units.

2. **Elementary German.** A continuation of German 1. Syntax. Oral and written exercises. Reading from more simple German prose. Three hours. One semester.
Prerequisite: German 1. Three units.

3. **Intermediate German.** Review of syntax. Translation. Oral and written exercises. Reading from German scientific works to acquire a technical vocabulary. Three hours. One semester.
Prerequisite: German 2. Three units.

4. Intermediate German. Reading and written and oral exercises in technical German. This course aims at preparing the students to undertake the reading of the more difficult scientific works. Three hours. One semester.

Prerequisite: German 3. Three units.

Courses for Advanced Undergraduates and Graduates

170. Seminar. A study of the special periods and writers in German literature, with emphasis on their literary qualities. The development of fluency in German composition and pronunciation. An easy reading, writing and conversational knowledge of German is presumed. Hours and credits to be arranged.

ITALIAN

Courses for Undergraduates

1. Elementary Italian. Elements of Italian Grammar. Drill in Pronunciation. Vocabulary. Three hours. One semester.

Three units.

2. Elementary Italian. A continuation of Italian 1. Syntax; oral and written exercises. Reading from simpler Italian prose. Three hours. One semester.

Prerequisite: Italian 1. Three units.

3. Intermediate Italian. Review of Grammar and Syntax. Translation. Oral and written exercises. Reading of somewhat difficult Italian prose. Three hours. One semester.

Prerequisite: Italian 2. Three units.

4. Intermediate Italian. Reading, written and oral exercises. This course aims at preparing the student to read the more difficult Italian writers. Three hours. One semester.

Prerequisite: Italian 3. Three units.

Courses for Advanced Undergraduates and Graduates

170. Seminar. A study of special periods and writers in Italian literature, with emphasis on their literary qualities. The development of fluency in Italian composition and pronunciation. An easy reading, writing and conversational knowledge of Italian is presumed. Hours and credits to be arranged.

SPANISH

Courses for Undergraduates

1. Elementary Spanish. Elements of Spanish grammar. Drill in pronunciation. Vocabulary. Three hours. One semester.

Three units.

2. Elementary Spanish. A continuation of Spanish 1. Syntax, oral and written exercises. Reading from the simpler Spanish prose. Three hours. One semester.

Prerequisite: Spanish 1. Three units.

3. Intermediate Spanish. Review of grammar and syntax. Translation. Oral and written exercises. Reading of somewhat difficult Spanish prose. Three hours. One semester.
Prerequisite: Spanish 2. Three units.

4. Intermediate Spanish. Reading, written and oral exercises. This course aims at preparing the student to read the more difficult Spanish writers. Three hours. One semester.
Prerequisite: Spanish 3. Three units.

Courses for Advanced Undergraduates and Graduates

170. Seminar. A study of special periods and writers in Spanish literature, with emphasis on their literary qualities. The development of fluency in Spanish composition and pronunciation. An easy reading, writing and conversational knowledge of Spanish is presumed. Hours and credits to be arranged.

PHILOSOPHY

Courses for Undergraduates

1. Logic: Dialectics. Simple Apprehensions. Terms—their supposition, definition and division. Judgments. Propositions. Classification according to Quantity and Quality; Opposition, Equivalence, Conversion. Reasoning—underlying Principles. The syllogism; its Laws and Species. Induction. Method. The Circle. Shallo's Scholastic Philosophy. Two hours. First semester. Two units.

2. Logic: Critics. Logical Truth and Falsity. States of the mind as to truth. Certitude; Degrees, Elements, Kinds. Scepticism, Universal and Partial. Consciousness. The Senses. Nominalism, Conceptualism. Realism. Ultra-Realism. Testimony. Tradition, History. The New Criticism. Reason and Revelation. The Ultimate Motive of Certitude. Evidence. Shallo's Scholastic Philosophy. Two hours. Second semester.
Prerequisite: Philosophy 1. Two units.

3. Ontology. Being. Analogy. Axioms. Unity, Identity, Distinction—Real and Logical. Truth. Goodness, Evil. Act and Potentiality. Essence and Existence. Possibility, Extrinsic, Intrinsic. Sources of the latter. Substance—Complete, Incomplete. Hypostasis. Person. Accident—Absolute, Relative. The Categories of Aristotle. Shallo's Scholastic Philosophy. Three hours. First semester.
Prerequisite: Philosophy 2. Three units.

4. **General Metaphysics.** The principle. The Cause. The condition. The Occasion. Matter—Primordial and Secondary. Form—Substantial, Accidental. Efficiency and Action. Finality. The Order of Intention and the Order of Achievement. The Exemplar. Grades of Perfection. Beauty. Shallo's Scholastic Philosophy. Three hours. Second semester.

Prerequisite: Philosophy 3. Three units.

11. **Logic.** (This course is described in the College of Engineering as Philosophy 111.) An elementary course in Logic intended primarily for students in the College of Engineering and in the Premedical Department. The reasoning faculties and processes. Laws of thought. Truth. Certitude. Doubt. False systems. Three hours. First semester. Three units.

12. **Ontology, Psychology.** (This course is described in the College of Engineering as Philosophy 112.) Being, its origin, development, explanation. Life, its origin and kinds. Origin and Species. Darwinism. Huxley. Haeckel. The Soul, its origin and spirituality. Three hours. Second semester.

Prerequisite: Philosophy 11. Three units.

13. **Theodicy.** (This course is described in the College of Engineering as Philosophy 113.) God, His existence, nature and attributes. Creation. Providence. Miracles. Three hours. First semester. Three units.

14. **Ethics.** (This course is described in the College of Engineering as Philosophy 114.) Right and Wrong. Natural Law. Sanction of Law. False forms of Morality. Worship. Homicide. Suicide. Duelling. Society. Marriage. Divorce. Socialism. Theories of Government. Suffrage. Liberty of the Press. Church and State. Three hours. Second semester.

Prerequisite: Philosophy 3. Three units.

Courses for Advanced Undergraduates and Graduates

101. **Cosmology.** Qualities of Bodies. Quantity—Discrete and Continuous. Mathematic Divisibility. Formal Effect. Impenetrability. Space. Place. Change—Substantial, Accidental. Motion and Time. Laws of Nature. Atomism, Dynamism, Hylomorphism. Organic Life in general. Vegetative Life. Sensitive Life; Origin of Species in the Organic World. Shallo's Scholastic Philosophy. Three hours. First semester.

Prerequisite: Philosophy 4. Three units.

102. **Rational Psychology.** The Intellect. Genesis of Ideas. Self-consciousness. Judgment and Reasoning. Hypothesis of Innate Ideas. Empiricism. Ontologism. The Will—Freedom, Arguments,

Control over Faculties. The Soul—Substantiality, Simplicity, Spirituality, Immortality. The Unity of Each Individual. Union of Body and Soul. Origin of the Human Soul. Traducianism. Creationism. Pre-existentianism, Unity and Antiquity of the Race. Shallo's Scholastic Philosophy. Three hours. Second semester.

Prerequisite: Philosophy 101. Three units.

103. Natural Theology and General Ethics. (a) **Existence and Nature of God.** Metaphysical, Physical, Moral Proofs; Aseity, Infinity, Immensity. Life of God: Intelligence; The Futuribles; Will—Primary and Secondary Object; Moral and Physical Evil. Action of God in the Universe: Creation, Conservation, Concurrence, Providence, Miracles. Shallo's Scholastic Philosophy.

(b) **General Ethics.** Nature, Object, Necessity of Ethics. Teleology, Beatitude. Human Acts. Voluntary and Involuntary Acts. Morality of Human Acts and its Determinants. Passions. Habits. Moral Obligation and its Origin. Eternal Law. Natural Law. Sanction of Law. False Norms of Morality. Utilitarianism. Hedonism. Altruism. Wood's First Book of Ethics. Three hours. First semester.

Prerequisite: Philosophy 102. Three units.

104. Special Ethics. Duties, Worship. Internal and External Worship, False Worship. Homicide. Self-defense, Suicide. Duelling. Veracity. Charity. Rights. Private Ownership. Communism. Socialism. Agrarian Socialism. Henry George. Herbert Spencer. Capital and Labor. Domestic Society. Matrimony. Divorce. Celibacy. Parental Authority, Education. Relation of Master and Servant. Civil Society, its Nature and Origin. False Theories of Hobbes, Rousseau, Locke. Forms, Scope, Aim, Function of Civil Government. Suffrage. Liberty of Opinion, of the Press, of Worship, of Association. International Law. Church and State. Wood's First Book of Ethics. Three hours. Second semester.

Prerequisite: Philosophy 103. Three units.

107. History of Philosophy. Socrates. Plato. Aristotle. Stoicism. Epicureanism. Plotinus. Alexandrian Philosophy. St. Augustine. Early Christian Philosophy. Scholastic Philosophy. St. Thomas. Modern Philosophy. Descartes. Locke. Hume. Kant. Hegel. Spencer. Neo-Scholasticism. Turner's History of Philosophy. Three hours. One semester.

Prerequisite: At least two years of Philosophy. Three units.

170. Seminar. A study of particular periods and problems in Philosophy, with assigned readings, discussions and thesis. Hours and credits to be arranged.

POLITICAL AND SOCIAL SCIENCES

POLITICAL ECONOMY

Courses for Undergraduates

1A. Principles of Economics. (This course is described in the College of Business Administration as B. A. 1A-1B.) The economic principles involved in the production, distribution and consumption of wealth. Study of textbook supplemented by lectures, discussions and assigned readings. Three hours. First semester.

Prerequisite: Sophomore standing. Three units.

1B. Principles of Economics. A continuation of Political Economy 1A. Three hours. Second semester.

Prerequisite: Political Economy 1A. Three units.

15. Economic History of Europe. (Described in the College of Business Administration as B. A. 15.) Three hours. First semester. Three units.

16. Economic History of the United States. (Described in the College of Business Administration as B. A. 16.) Three hours. Second semester. Three units.

Courses for Advanced Undergraduates and Graduates

101. Principles of Political Economy. (This course is described in the College of Business Administration as B. A. 101.) An advanced course in the history, methods and principles of Political Economy, with special reference to wealth, value, price, production and the factors of exchange, money and credit. Three hours. First semester.

Prerequisite: Junior standing. Three units.

102. Principles of Political Economy. A continuation of course 101, with special reference to socialism, labor problems, the tariff and modern economic problems. Three hours. Second semester.

Prerequisite: Political Economy 101. Three units.

111. Principles of Economics. (Described in the College of Engineering as Economics 111.) Object. Production, distribution, circulation and consumption of wealth. Production of wealth. Earth and natural agents. Labor and industry. Capital. Distribution of wealth. Individual property. Share of laborers. Circulation of wealth. Exchange. Taxes. Application. One hour. Second semester.

Prerequisite: Junior standing. One unit.

120. History of Public Finance and Taxation. (Described in the College of Business Administration as B. A. 120.) A survey of Public Finance and Taxation in the United States from colonial times to the present. Two hours. First semester. Two units.

121. Corporation Finance. (Described in the College of Business Administration as B. A. 121.) This course considers the elements of corporate form of business organization. Facts bearing on the evolution of the corporation, its functions and relation to other business units, and proper administration of the instruments of financing corporations are studied. Three hours. First semester.
Prerequisite: Political Economy 102. Three units.

122. Principles of Money and Banking. (Described in the College of Business Administration as B. A. 122.) Approximately one-third of the course is devoted to a study of money; its history, kinds of, functions, and systems of in the United States. The remainder of the course is devoted to a general consideration of banking with emphasis upon the National Banking System and the Federal Reserve System. Three hours. First semester.
Prerequisite: Political Economy 102. Three units.

124. Advanced Money and Banking. (Described in the College of Business Administration as B. A. 124.) A furthering of the work begun in course 122. The theories of money and of banking systems are explained. Foreign banking and currency systems come in for consideration, but the emphasis in the course is placed upon the Federal Reserve System as it is operated at the present time. Three hours. Second semester.
Prerequisite: Political Economy 123. Three units.

150. History of Labor in the United States. (Described in the College of Business Administration as B. A. 150.) The history and functions of labor and labor organizations in the United States. Three hours. One semester.
Prerequisite: Political Economy 102. Three units.

170. Railroad Transportation. (Described in the College of Business Administration as B. A. 170.) The development, operation and regulation of the railroads; the relation of the railroads to motor truck and water transportation; rate making; public utility valuation; the question of government ownership. Three hours. First semester.
Prerequisite: Political Economy 102. Three units.

175. Seminar. An advanced study of special problems, with conferences, reports, papers, assigned readings, etc. Hours and credits to be arranged.
Prerequisite: Political Economy 102.

For additional courses in particular economic problems see Bulletin, College of Business Administration.

SOCIOLOGY

Courses for Advanced Undergraduates and Graduates

101. Principles of Sociology. An introduction to the scientific study of social problems and their relation to the family and the individual. A study of the natural resources, population, immigration, labor organization, woman and child labor, poverty, crime, housing, etc. Three hours. One semester.

Prerequisite: Junior standing. Three units.

RELIGION

Courses for Undergraduates

1. Essentials of Christian Doctrine. Various Creeds. The Apostle's Creed. Each Article of the Creed is studied in particular, attention being given to any subject bearing directly on these articles, as Sin, The Powers of the Church, Infallibility, etc. Two hours. First semester. One unit.

2. Essentials of Christian Doctrine. The Law of God. What is commanded or forbidden by the Decalogue is studied in detail. The Precepts of the Church, Grace, Prayer, and each of the Seven Sacraments together with collateral subjects. Two hours. Second semester. One unit.

3. Christianity, A Revealed Religion. What Religion is. What Revelation is. Kinds of revelations. What revelation necessary to know truths above human knowledge. Man's attitude toward Revelation. Primitive, Patriarchal, Mosaic Revelation. The Divine origin of Pre-Christian Revelation. The Christian Revelation: its origin, evidences of the divinity of its origin. Two hours. First semester. One unit.

4. The Church: The Dispenser of the Christian Religion. Institution of the Church. End of the Church. Constitution of the Church. Marks of the Church. The teaching office of the Church. Sources of the Church's teaching. The Rule of Faith. Two hours. Second semester. One unit.

11. Essentials of Christian Doctrine. (Described in the College of Engineering as Religion 11.) Two hours. First semester. One unit.

12. Essentials of Christian Doctrine. (Described in the College of Engineering as Religion 12.) Two hours. Second semester. One unit.

13. Christianity, A Revealed Religion. (Described in the College of Engineering as Religion 13.) Two hours. First semester.

14. The Church: The Dispenser of the Christian Religion. (Described in the College of Engineering as Religion 14.) Two hours. Second semester. One unit.

Courses for Advanced Undergraduates and Graduates

101. Christian Dogma. God, the Author and Restorer of Our Salvation. The existence, nature and attributes of God. The Divine Trinity. God, the creator of the universe. Various grades of creation. The spiritual and material world. Man. Relation of different orders of creation to one another. God, the Redeemer of fallen man. Decree and plan of redemption. The Redeemer—one person and two natures. The work of redemption. Two hours. First semester. One unit.

102. The Plan of Redemption as Realized in Individuals. Grace, actual, habitual or sanctifying. The Sacraments as a means of Grace. The Sacraments are studied in general—their matter and form; their efficacy and the dispositions requisite to receive them validly and with fruit. Then each Sacrament is studied in detail. The Church as a means of salvation. The four last things. Two hours. Second semester. One unit.

103. Christian Morals in General. Law as the objective norm of human actions. Conscience as the subjective norm of human actions. The conditions of morality. Moral good and moral evil. Two hours. First semester. One unit.

104. Christian Morals in Particular. The Christian's duties toward God—Faith, Hope, Charity. Religion. Direct and indirect acts of worship. The Church as the controller of religious worship. Duties towards ourselves and our neighbor—general and particular. Works of Supererogation or Christian Perfection. Two hours. Second semester. One unit.

111. God, the Author and Restorer of Our Salvation. (Described in the College of Engineering as Religion 111.) Two hours. First semester. One unit.

112. The Plan of Redemption as Realized in Individuals. (Described in the College of Engineering as Religion 112.) Two hours. Second semester. One unit.

113. Christian Morals in General. (Described in the College of Engineering as Religion 113.) Two hours. First semester. One unit.

114. Christian Morals in Particular. (Described in the College of Engineering as Religion 114). Two hours. Second semester. One unit.

SCIENCE

BIOLOGY

Courses for Undergraduates

1. **General Biology.** An introductory course designed to lay a broad foundation of the general principles of biology as a part of a liberal education, as a preparation for the study of medicine, or for advanced work in science. Structure, life histories, and physiology of typical animals are studied in the laboratory. Two hours Lecture; two hours Laboratory. First semester. Three units.

2. **General Biology.** A continuation of Biology 1. Two hours Lecture; two hours Laboratory. Second semester. Three units.

3. **Embryology.** Cell division, spermatogenesis, ovogenesis, fertilization, cleavage, gastrulation and the origin of the germ layers of various invertebrates and vertebrates. The study of the development of the different systems. The laboratory work includes a study of chick embryo living specimens, 24-72 hours of incubation. A study of chick embryo whole mounts up to 72 hours. A study of serial, cross and sagittal sections of chick embryo up to 72 hours. Two hours Lecture; four hours Laboratory. First semester.
Prerequisite: Biology 1, 2. Four units.

4. **Comparative Anatomy.** Comparative studies of adult forms, their organs and organ systems. The laboratory work is devoted to the critical dissection of the cat, and dog fish. Two hours Lecture; four hours Laboratory. Second semester.
Prerequisite: Biology 4. Four units.

CHEMISTRY

1. **Elementary Inorganic Chemistry.** Discussion of elementary laws and principles. Properties of the more important elements and their compounds. Open to all students. Two hours Lecture. First semester. Two units.

2. **Elementary Inorganic Laboratory.** Laboratory course to accompany Chemistry 1. Illustrating fundamental laws and principles. Four hours Laboratory. First semester. Two units.

3. **General Inorganic Chemistry.** A continuation of Chemistry 1. Review of elementary principles and properties of the more important elements with their compounds. Includes a systematic study of important theories. Two hours Lecture. Second semester.
Prerequisite: Chemistry 1, 2. Two units.

4. **General Inorganic Laboratory.** Laboratory course to accompany Chemistry 3. Four hours Laboratory. Second semester.
Prerequisite: Chemistry 1, 2. Two units.

11. **General Inorganic Chemistry.** For Engineers and Pre-Medics. Review of elementary principles and properties of the more

important elements with their compounds. Includes a systematic study of important theories. Two hours Lecture. First semester. Two units.

12. **General Inorganic Chemistry Laboratory.** Laboratory course to accompany Chemistry 11. Four hours Laboratory. First semester. Two units.

13. **Qualitative Analysis.** A study of the principles of analytical chemistry. This course includes the descriptive chemistry of the metals. Two hours Lecture. Second semester.

Prerequisite: Chemistry 11, 12. Two units.

14. **Qualitative Analysis Laboratory.** Laboratory course to accompany Chemistry 13. Dry and wet Analysis. Fundamental work in preparation for Quantitative Analysis. Four hours Laboratory. Second semester.

Prerequisite: Chemistry 11, 12. Two units.

21. **Organic Chemistry.** A study of the compounds of carbon and their derivatives. The properties of the more important compounds are discussed, special attention is given to the alphatic series. Three hours Lecture. First semester.

Prerequisite: Chemistry 13, 14. Three units.

22. **Organic Chemistry Laboratory.** Laboratory course accompanying Chemistry 21. The typical cyclic and acyclic compounds are prepared and their properties investigated. Four hours Laboratory. First semester.

Prerequisite: Chemistry 13, 14. Two units.

23. **Quantitative Analysis.** Gravimetric and volumetric analysis. The work is regarded as preliminary training for more advanced work. Special attention is given to stoichimetrical relations and the application of the fundamental laws of chemistry to qualitative analysis. One hour Lecture. Second semester.

Prerequisite: Chemistry 21, 22. One unit.

24. **Quantitative Analysis Laboratory.** Laboratory course to accompany Chemistry 23. Four hours Laboratory. Second semester.

Prerequisite: Chemistry 21, 22. Two units.

Courses for Advanced Undergraduates and Graduates

170. **Seminar and Thesis.** Arrangements are made in this course for advanced individual or class work, and for the investigation of particular problems. Hours and credits are determined by the extent and character of work performed.

Prerequisite: Two years of Chemistry.

For Upper Division students majoring in Science the Department of Chemistry offers a limited amount of advanced work, which can be done privately under the direction of the Head of the Department.

GEOLOGY

Courses for Undergraduates

33. Geology. A course in dynamical, structural and historical Geology. Particular attention is paid to structural Geology and the influences of Constructive and Engineering conditions. The student is made familiar with different stones by illustrating each recitation with specimens of the particular rocks treated, as well as their adaptability in construction, method of occurrence, etc. Ries and Watson's Engineering Geology. Three hours. First semester.
Three units.

34. Mineralogy. A course in Mineralogy with access to a large collection of specimens. Determination of unlabeled specimens. Crystallography. Blowpipe analysis. Includes a short course in Metallurgy. Iron ores and production of iron and steel. Percentage and effects of sulphur, silicon, manganese and carbon in iron and steel. Coals, Coke, Carbons, and ash. Ries and Watson's Engineering Geology. Three hours. Second semester.
Prerequisite: Geology 33. Three units.

PHYSICS

Courses for Undergraduates

1. Mechanics, Molecular Physics, Sound. General principles of matter. General properties of Bodies. Equilibrium. Gravity. Pendulum. Properties peculiar to Solids. Capillarity. Hydro-dynamics. The properties of gases. Aerodynamics. Production, propagation and reflection of sound. The physical theory of music. Three hours Lecture. First semester. Carhart's College Physics.
Three units.

2. Physical Laboratory. Laboratory course to accompany Physics 1. Two hours Laboratory. First semester. One unit.

3. Light, Heat, Electricity. Transmission, velocity and reflection of light. Mirrors. Lenses. Dispersion and achromatism. Optical instruments. The eye. Double refraction. Interference and polarization. Properties of magnetism. Laws of magnetic action. Terrestrial magnetism. Quantitative laws of electric action. Distribution. Electro-static induction of influence. Electric machines. Condensation of electricity. Voltaic cell. Its modifications. Magnetic field due to current. Galvonometers. Ohm's law. Conversion of electric energy into heat. Thermo-electricity. Electro-dynamics. Electro-magnets. Magnetization of iron. Telegraphy. Electro-magnetic induction. Passage of electricity through gases. Magneto and dynamo-electric machines. Dia-magnetism. Connection between

electricity and light. Carhart's College Physics. Three hours Lecture. Second semester.
Prerequisite: Physics 1, 2. Three units.

4. **Physical Laboratory.** Laboratory course to accompany Physics 3. Two hours Laboratory. Second semester.
Prerequisite: Physics 1, 2. One unit.

11. **Mechanics, Molecular Physics, Sound.** An elementary course corresponding to Physics 1 intended primarily for students in the College of Engineering. Two hours Lecture. First semester. Two units.

12. **Physical Laboratory.** Laboratory course to accompany Physics 11. Four hours Laboratory. First semester. Two units.

13. **Light, Heat, Electricity.** A continuation of Physics 11 for students in the College of Engineering. Two hours Lecture. Second semester.
Prerequisite: Physics 11, 12. Two units.

14. **Physical Laboratory.** Laboratory course to accompany Physics 13. Four hours Laboratory. Second semester.
Prerequisite: Physics 11, 12. Two units.

Courses for Advanced Undergraduates and Graduates

104. **Electrical Measurements.** A laboratory course in Electrical Measurements intended primarily for students of Electrical Engineering. Two hours Laboratory. One semester.
Prerequisite: Physics 13, 14. One unit.

121. **Astronomical Physics.** A laboratory course in the study of Astronomical, Meteorological and Seismological phenomena in connection with the Observatory. Hours and credits to be arranged.
Prerequisite: One year of Physics and two years of Mathematics.

170. **Seminar and Thesis.** Advanced course for individual or class work in physical problems. Hours and credits to be arranged.

For Upper Division students majoring in Science the Department of Physics offers a limited amount of advanced work, which can be done privately under the direction of the Head of the Department.

COLLEGE OF BUSINESS ADMINISTRATION

ADVISORY COUNCIL

John P. Burke
Vice-President, First National Bank, Los Angeles

J. G. Hooper
Vice-President, First Federal Trust Company, San Francisco

George W. Peltier
Vice-President, California National Bank, Sacramento

Hon. James D. Phelan
Capitalist, San Francisco

Victor H. Rossetti
Vice-President, Farmers and Merchants Bank, Los Angeles

Paul Shoup
Vice-President, Southern Pacific Company, San Francisco

R. B. Teefy
Vice-President, Bank of Italy, Stockton

A. G. Wishon
Vice-President, San Joaquin Light and Power Company, Fresno

BOARD OF EXECUTIVES

Robert F. Benson
Manager, Benson & Weaver

George B. Campbell
Cashier, Security Savings Bank

David A. Manning
Manager, Pacific Telephone and Telegraph Company

Thomas S. Montgomery
Vice-President, Mercantile Trust Company

Nicholas A. Pellerano
Director, Bank of Italy

FACULTY

Zacheus Joseph Maher, S. J., A. M.
President

John Aloysius Lennon, S. J., A. M.
Dean of Faculties

William Henry Pabst
Dean

Cornelius Joseph McCoy, S. J., A. M.
Director of Discipline

Eugene Michael Bacigalupi, S. J., A. M.
Professor of Physics

Albert. M. Casey, S. J., A. M.
Professor of Philosophy

Arthur Vincent Coghlan, S. J., A. M.
Professor of English, Latin and Religion

Cornelius Francis Deeney, S. J., A. M., Ph. D.
Professor of Economics and Religion

Peter M. Dunne, S. J., A. M.
Professor of History

Joseph Robert Fernandez
Professor of Spanish

Mark A. Gaffney, S. J., A. M.
Professor of Religion

David J. Guthrie
Instructor in Mathematics

Edward John Kelly, B. S.
Professor of Accounting

James J. Kelly, S. J., A. M.
Professor of Chemistry and Mathematics

Henry Lecat, Brev. Sup., Paris
Professor of French

Peter John Mootz, S. J., A. M.
Professor of Philosophy and Religion

Peter F. Morettini, A. B., LL. B.
Professor of Commercial Law

Edward Preston Murphy
Professor of German

Aloysius Roccati, S. J., A. M.
Professor of Italian

William Bernard Ryan, B. S.
Professor of Business Administration

Bartholomew Richard Sullivan, B. S.
Professor of Commercial Geography

Daniel E. Sullivan, LL. B., LL. M.
Professor of Public Speaking

Ernest P. Watson, S. J., A. M.
Professor of Mathematics

Henry Woods, S. J., Ph. D.
Professor of Ethics

COLLEGE OF BUSINESS ADMINISTRATION

GENERAL STATEMENT

The College of Business Administration aims to train students to meet the general as well as specific problems of modern industry.

A knowledge of accounting, banking, credit, labor conditions, marketing, insurance, statistics, business organization and administration, and of business law is essential for anyone who aspires to take part in the organization and management of our modern specialized industrial system.

The studies in ethics, logic, psychology, history and science, provide the student with the broader fundamental principles necessary for dealing with the industrial system in its social relationships.

Extreme specialization is not aimed at in the College of Business Administration, although each student is required to select a major in one of the three basic departments, i. e., courses relating specifically to Business Organization and Administration, Finance or Accounting.

Regardless of the department selected for a major all students are required to include in their curriculum a sufficient number and diversification of courses to provide a comprehensive preparation for general business problems.

KENNA HALL

The College of Business Administration is located on the main floor of the new Kenna Hall, with class-rooms, accounting and statistical laboratories, library and club rooms, and offices.

BUSINESS ADMINISTRATION ASSOCIATION

The Business Administration Association, composed of students and faculty in the College of Business Administration, supplements the class work by regular meetings for the discussion of business problems, and by occasional social gatherings.

BUSINESS LECTURES

Throughout the year a series of lectures is given by business and public men of prominence on various problems of interest to the student body. These lectures bring the students into personal contact with representative business men and also enable them to become familiar with practical business problems.

INSPECTION TRIPS

The close connection of the University with the business and industrial establishments of the San Francisco Metropolitan district enables the faculty to arrange various inspection trips to such industries as may be of interest. In this way students are given a practical insight into the business organization and working of representative industries.

GRADUATION

The curriculum of the College of Business Administration extends over four years and leads to the degree of Bachelor of Commercial Science (B. C. S.).

The work in this college is divided into lower division and upper division work.

Graduation from this college requires the completion of 124 units of college work of which 64 units constitute the amount required in the University for the junior certificate.

LOWER DIVISION

The requirements for the junior certificate in the College of Business Administration are as follows:

1. The successful passing of Subject A, prescribed in all departments of the University.

2. The equivalent of 6 units in one of the following languages: Greek, Latin, French, Spanish, Italian, or German and in addition the successful passing of an examination designed to test the student's ability to read one of the above named languages.

3. The submission of an essay of not fewer than 5000 words as stated in the General Regulations.

4. The successful completion of the following courses which are specifically required in the lower division:

English	6 units
Religion	4 "
Logic	4 "
Philosophy	6 "
Modern Languages	6 "
Mathematics of Investment	3 "
Principles of Economics (B.A. —1A and 1B)	6 "
Modern European History	6 "
Natural Sciences	8 "
Accounting (B. A.—10A and 10B)	6 "
Economic Geography (B. A.—3A and 3B)	6 "
Introduction to Business (B. A.—18)	2 "

The prerequisite for Mathematics of Investment is Advanced Algebra, (taken in the University) or two full years of high school algebra. If a student has only one and one-half years of high school algebra it will be necessary for him to begin his University work with Advanced Algebra, from which he will pass to Mathematics of Investment.

SCHEDULE OF COURSES

Freshman Year

First Semester	Units	Second Semester	Units
English (Eng. 1)	3	English (Eng. 2)	3
Public Speaking (P. S. 1)	1	Public Speaking (P. S. 2)	1
Logic (Philos. 1)	2	Logic (Philos. 2)	2
Modern Language	3	Modern Language	3
Advanced Algebra (Math. 3)	3	Mathematics of Investment (Math. 8)	3
History (History 1)	3	History (History 2)	3
Religion (Religion 1)	1	Religion (Religion 2)	1

Sophomore Year

Philosophy (Philos. 3)	3	Philosophy (Philos. 4)	3
Accounting (B. A. 10A)	3	Accounting (B. A. 10B)	3
Principles of Economics (B. A. 1A)	3	Principles of Economics (B. A. 1B)	3
Economic Geography (B. A. 3A)	3	Economic Geography (B. A. 3B)	3
Chemistry 1, 2, or Physics 1, 2	4	Chemistry 3, 4 or Physics 3, 4	4
Religion (Religion 3)	1	Religion (Religion 4)	1

UPPER DIVISION

The requirements for graduation in addition to those for the junior certificate are as follows:

Technical subjects	28 units
Commercial Law	10 "
Philosophy	12 "
Electives	10 "
Total	60 units

The technical subjects are distributed as follows:

(a) Seven units are required of all students, namely:

Statistics	4 units
Economic History	3 "

Where the arrangement of courses is such as to make it possible the requirement in Economic History may be fulfilled before taking the junior certificate.

(b) Twelve units covering at least four different subjects in applied economics other than the above such as, money and banking, business organization and administration, accounting, finance, labor, transportation.

(c) Nine units of advanced work in some one of the subjects begun under provision (b) above. In the case of a major in accounting this requirement is to be interpreted as requiring nine units of advanced work in addition to courses 10A and 10B which will be completed in the lower division.

Candidates for a degree shall submit a thesis on their major or allied subject of not fewer than 5000 words as provided for in the General Regulations.

Students who elect Business Organization and Administration as a major are required to take Managerial Accounting (B. A. 135) during the Junior year.

DESCRIPTION OF COURSES

The courses in the College of Business Administration are numbered as follows:

Numbers 1 to 99 inclusive denote lower division courses.

Numbers 100 to 199 inclusive denote upper division courses.

B. A. (Business Administration) is the title of all courses.

Courses for Undergraduates

B. A. 1A-1B. Principles of Economics. Required for all upper division work in the College of Business Administration. Two semesters.

Prerequisite: Sophomore standing. Three units each semester.

B. A. 3A. Economic Geography. An introduction to the areal background of human activities. Climatic, land, and space relationships considered in their relation to human activities. Map studies are afforded by the selection of type areas. First semester.

Three units.

B. A. 3B. Economic Geography. A regional introduction to world geography in which the elements of B. A. 3A are considered in their sum as differentiating the world into natural regions. These regions are studied in terms of character, density, stage of development of population, etc. Map studies are followed out. Second semester.

Prerequisite: Course 3A. Three units.

B. A. 10A. Principles of Accounting. This course covers the basic principles of modern accounting together with the mechanical and technical aspects of the recording of actual business transactions. Illustrative problems are used throughout the course. Two hours lecture and two hours laboratory. First semester.

Prerequisite: Sophomore standing. Three units.

B. A. 10B. Principles of Accounting. An intensive study of the theories upon which present day accounting practice is based. Illustrative problems accompany all reading matter. Two hours lecture and two hours laboratory. Second semester.

Prerequisite: Course 10A. Three units.

B. A. 15. Economic History of Europe. A general survey of the economic development of Europe from the eleventh century to modern times, with special emphasis upon the growth and development of English industry and commerce. First semester.

Three units.

B. A. 16. Economic History of the United States. A study of the economic development of the United States with special reference to the labor problems arising from the rapid growth of the factory system in industry. Second semester. Three units.

B. A. 18. Introduction to Business. A course designed to give the student a view of business in its entirety before studying the details in advanced work. Also to connect with his new studies in business procedure, the courses in sciences and arts pursued in preparatory school and in his first two semesters in college. Second semester. Two units.

Courses for Advanced Undergraduates and Graduates

B. A. 100. Elementary Statistics. Sources, organization, and interpretation of statistical data applicable to actual business problems. How to make practical use of facts developed in actual business experience. No attempt is made to stress the **theory** of statistics, nor to go deeply into mathematics. However, students undertaking this course should have had a thorough course in higher algebra. Required of all students in the College of Business Administration. Second semester. Two lectures and one laboratory period. *Prerequisite:* At least junior standing. Four units.

B. A. 101. Economic Theory. Advanced study of the principles of demand and supply including costs; of the functions of the different agents of production; of wages; interest, rent and profits; and of the means for promotion of welfare. Recommended as a course for seniors. Either semester. Two units.

Finance Group

B. A. 120. History of Public Finance and Taxation. A survey of Public Finance and Taxation in the United States from colonial times to the present. First semester. Two units.

B. A. 121. Corporation Finance. This course considers the elements of corporate form of business organization. Facts bearing on the evolution of the corporation, its functions and relation to other business units, and proper administration of the instruments of financing corporations, are studied. First semester. Three units.

B. A. 122. Principles of Money and Banking. Approximately one third of the course is devoted to a study of money; its history, kinds of, functions, and systems of in the United States. The remainder of the course is devoted to a general consideration of banking with emphasis upon the National Banking System and the Federal Reserve System. First semester. Three units.

B. A. 123. Investments. The relative merits of the various types of investments, from the point of view of the individual or private investor. Second semester. Two units.

B. A. 124. Advanced Money and Banking. A furthering of the work begun in course 122. The theories of money and of banking systems are explained. Foreign banking and currency systems come in for consideration, but the emphasis in the course is placed upon the Federal Reserve System as it is operated at the present time. Second semester.

Prerequisite: Course 122. Three units.

B. A. 125. Elements of Foreign Exchange. The methods of banking and financing followed in international trade. Detailed consideration of the commercial paper used in foreign trade, such as checks, drafts, bills, etc. Also considers gold movements between countries and their effects on currency, banking and general business. Second semester.

Prerequisite: Course 122. Three units.

B. A. 126. Business Cycles. A study of the history of periods of business depression and prosperity; phenomena attending such fluctuations; and a consideration of various means which have been suggested for the attainment of a greater degree of stability in business. Second semester.

Prerequisite: Course 122. Three units.

Accounting Group (Kelly)

B. A. 130A-130B. Accounting Problems. A study of the preparation of various types of financial statements and the problems peculiar to partnerships, corporations, and insolvent concerns. Illustrative problems solved and discussed. Two semesters.

Prerequisite: Course 10B. Three units each semester.

B. A. 132. Auditing. A study of the methods of procedure in modern auditing practice and the theories upon which they are based. First semester.

Prerequisite: Course 10-B. Two units.

B. A. 133. Industrial Accounting. An analysis of the various methods of allocation of costs and overhead in modern industry. Second semester.

Prerequisite: Course 10B. Two units.

B. A. 135. Managerial Accounting. A course in the methods of interpreting the information found in a modern set of books of account and the statements prepared therefrom. First semester.

Prerequisite: Course 10B. Three units.

B. A. 139. Federal Income Taxes. Actual preparation of individual and corporation income tax returns as required under the present internal revenue laws. The current revenue laws and the regulations issued thereunder form the basis of the course. Second semester.

Prerequisite: Course 10B and Senior standing. Three units.

Business Administration Group

B. A. 140. Business Organization. Organization of business enterprises; private and legal aspects; their evolution; process of organizing; individual proprietor; partnership; joint stock company; corporations. First semester. Three units.

B. A. 141. Business Management. General principles of management; executive department; major problems of administration and control; general manager; departmental interrelation; divisional supervision; routine and discipline; purchasing and receiving; store systems. Second semester.

Prerequisite: Course 140. Three units.

B. A. 142. Marketing. The nature and importance of marketing; producer and consumer classifications; extent of and forces behind markets; marketing functions; cooperative marketing; methods of retail and wholesale distribution; the transportation problems connected with marketing; market price; government authority; trend of marketing methods and policies at present. First semester. Three units.

B. A. 143. Principles of Advertising. The theory and practice of advertising; study of the mediums of advertising and preparation of copy. First semester.

Prerequisite: Course 142. Three units.

B. A. 144. Salesmanship and Sales Management. The principles and practice of personal salesmanship; the principle of sales management; methods of employing, training, paying, and supervising salesmen; management of sales campaigns. Second semester.

Prerequisite: Course 142. Three units.

Labor and Personnel

B. A. 150. History of Labor in the United States. The history and functions of labor and labor organizations in the United States. Either semester. Three units.

B. A. 155. Introduction to Personnel Administration. A survey course setting forth the needs for personnel studies in management; special problems concerning selection of workmen and their education, training, incentive and supervision. Either semester.

Prerequisite: Courses 140 and 141. Two units.

Insurance

B. A. 160. Principles of Insurance. Origin and forms of insurance; its place in modern industry and society. Separate considerations of such forms as fire, life, theft, indemnity and accident, etc. First semester. Two units.

Transportation

B. A. 170. Railroad Transportation. The development, operation and regulation of the railroads; the relation of the railroads to motor truck and water transportation; rate making; public utility valuation; the question of government ownership. First semester. Three units.

Foreign Trade

B. A. 180. Principles and Methods of International Trade. Economic theory of international trade; significance of foreign trade, merchant marine, and port development; national policies affecting international commerce; export and import methods; export organization; governmental assistance. Second semester. Three units.

COMMERCIAL LAW

1. Contracts and Agency. Elements of a contract; parties; consideration; illegal and void contracts; construction; verbal and written contracts; Statute of Frauds; termination; breach; damages. Agency; who may be agents and how appointed; rights and duties of agents and principals in reference to each other and third parties; termination. Two hours. One semester. Two units.

Y 13. A 140

2. Partnerships and Corporations. Articles of co-partnership; rights of partners against each other; rights of creditors against firm and partners; kinds of partners; termination; liquidation of assets. Corporations: charter and by-laws; stockholders' and directors' meetings; forms of corporate stock; elections; ultra vires acts; directors' and stockholders' liabilities; rights of creditors; dissolution. Two hours. One semester. Two units.

3. Sales, Bailments and Carriers. The contract of sale; immediate and future sales; rights and duties of consignee, consignor and carrier; stoppage and loss in transit; setting aside sales; warranties. Bailments: nature and classification; innkeepers. Common carriers: carriers of passengers; of goods; telegraph and telephone companies. Two hours. One semester. Two units.

4. **Negotiable Instruments and Bankruptcy.** Bills, notes, drafts and checks; acceptance of drafts; certified checks; rights and liabilities of endorsers; presentment; notice of dishonor; protest. Bankruptcy: who may become bankrupts; exemptions; duties; compositions; discharge; offenses against bankruptcy law; trustees and referees; preferred creditors. Two hours. One semester. Two units.

5. **Tenancy and Insurance.** Nature of real property; kinds of estates; rights and liabilities of landlord and tenant; fixtures; mortgages; titles; conveyancing; deeds. Insurance: premiums and assessments; representations and warranties; insurance agents and their powers; rights under the policy; fire, life, marine, accident, liability insurance. One hour. One semester. One unit.

6. **Trade Marks, Patents and Interstate Commerce Law.** Trade marks: trade labels; copyrights. Patents; rights and duties of holders thereof; duration and limitation of rights. Interstate Commerce Commission: nature and jurisdiction; decisions regarding rates, carriers, commerce, publication of tariffs, accounting, etc. One hour. One semester. One unit.

COURSES IN THE COLLEGE OF LIBERAL ARTS TAKEN BY STUDENTS IN THE COLLEGE OF BUSINESS ADMINISTRATION

For additional courses and full description see Bulletin, College of Liberal Arts.

CHEMISTRY

1. **General Inorganic Chemistry.** An elementary course in the fundamentals of Chemistry. Two hours Lecture. First semester. Two units.

2. **General Inorganic Chemistry Laboratory.** A laboratory course to accompany Chemistry 1. Four hours Laboratory. First semester. Two units.

3. **General Inorganic Chemistry.** An elementary course in the fundamentals continuing Chemistry 1. Two hours Lecture. Second semester.
Prerequisite: Chemistry 1, 2. Two units.

4. **General Inorganic Chemistry Laboratory.** A laboratory course to accompany Chemistry 3. Four hours laboratory. Second semester.
Prerequisite: Chemistry 1, 2. Two units.

ENGLISH

1. **Argumentation and Oratory.** A fundamental course in rhetoric, literature and composition. Three hours. First semester. Three units.

2. **Rhetoric.** A continuation of English 1. Exposition and Description. Themes. Three hours. Second semester.
Prerequisite: English 1. Three units.

HISTORY

1. **European History. The Renaissance and the Protestant Revolution.** An elementary course in European History. Three hours. First semester. Three units.

2. **European History. The Catholic Revival to the French Revolution.** A continuation of History 1. Three hours. Second semester. Three units.

MATHEMATICS

3. **College Algebra.** A course containing the usual matter and methods of Advanced Algebra, special attention being given to graphical methods. Three hours. One semester. Three units.

8. **Mathematical Theory of Investment.** A course in the fundamentals in the mathematics of business. Three hours. Second semester.
Prerequisite: Mathematics 3. Three units.

MODERN LANGUAGES

FRENCH

1. **Elementary French.** The elements of grammar. Three hours. First semester. Three units.

2. **Elementary French.** A continuation of French 1. Three hours. Second semester.
Prerequisite: French 1. Three units.

3. **Intermediate French.** A continuation of French 2. Three units. First semester.
Prerequisite: French 2. Three units.

4. **Intermediate French.** A continuation of French 3. Three hours. First semester.
Prerequisite: French 3. Three units.

GERMAN

1. **Elementary German.** Elements of German Grammar. Drill in pronunciation. Vocabulary. Three hours. First semester. Three units.

2. **Elementary German.** A continuation of German 1. Three hours. Second semester.
Prerequisite: German 1. Three units.

3. Intermediate German. A continuation of German 2. Reading from technical German works. Three hours. First semester.
Prerequisite: German 2. Three units.

4. Intermediate German. A continuation of German 3. Advanced reading and writing of technical German. Three hours. Second semester.
Prerequisite: German 3. Three units.

ITALIAN

1. Elementary Italian. Elements of Italian Grammar. Three hours. First semester. Three units.

2. Elementary Italian. A continuation of Italian 1. Three hours. Second semester.
Prerequisite: Italian 1. Three units.

3. Intermediate Italian. A continuation of Italian 2. Reading of more difficult Italian prose. Three hours. First semester.
Prerequisite: Italian 2. Three units.

4. Intermediate Italian. A continuation of Italian 2. Reading of Italian prose. Three hours. Second semester.
Prerequisite: Italian 3. Three units.

SPANISH

1. Elementary Spanish. Elements of Spanish Grammar. Three hours. First semester. Three units.

2. Elementary Spanish. A continuation of Spanish 1. Three hours. Second semester.
Prerequisite: Spanish 1. Three units.

3. Intermediate Spanish. Continuation of Spanish 2. Reading of advanced Spanish prose. Three hours. Second semester.
Prerequisite: Spanish 2. Three units.

4. Intermediate Spanish. A continuation of Spanish 3. Reading of advanced Spanish prose. Three hours. Second semester.
Prerequisite: Spanish 3. Three units.

PHILOSOPHY

1. Logic: Dialectics. The first principles of Logic. Two hours. First semester. Two units.

2. Logic: Critics. A continuation of Philosophy 1. Two hours. Second semester.
Prerequisite: Philosophy 1. Two units.

3. Ontology. The main principles of Ontology. Three hours. First semester.
Prerequisite: Philosophy 2. Three units.

4. **General Metaphysics.** A continuation of Philosophy 3. Three hours. First semester.
Prerequisite: Philosophy 3. Three units.

Courses for Advanced Undergraduates and Graduates

101. Cosmology. The general principles of Cosmology. Three hours. First semester.
Prerequisite: Philosophy 102. Three units.

102. Rational Psychology. The general principles of Psychology. Three hours. Second semester.
Prerequisite: Philosophy 102. Three units.

103. Natural Theology and General Ethics. Three hours. First semester.
Prerequisite: Philosophy 102. Three units.

104. Special Ethics. A continuation of Philosophy 103. Three hours. Second semester.
Prerequisite: Philosophy 103. Three units.

POLITICAL ECONOMY

For description of the courses in Political Economy see courses in Business Administration.

PHYSICS

1. **Mechanics, Molecular Physics, Sound.** An elementary course in the principles of Physics. Three hours Lecture. First semester. Three units.

2. **Physical Laboratory.** Laboratory course to accompany Physics 1. Two hours Laboratory. First semester. One unit.

3. **Light, Heat, Electricity.** A continuation of Physics 1. Three hours Lecture. Second semester.
Prerequisite: Physics 1, 2. Three units.

4. **Physical Laboratory.** Laboratory course to accompany Physics 3. Two hours Laboratory. Second semester.
Prerequisite: Physics 1, 2. One unit.

PUBLIC SPEAKING

1. **Fundamentals of Expression.** A fundamental course in Expression. Two hours. First semester. One unit.

2. **Fundamentals of Expression.** A continuation of Public Speaking 1. Two hours. Second semester.
Prerequisite: Public Speaking 1. One unit.

COLLEGE OF ENGINEERING

FACULTY

Zacheus Joseph Maher, S. J., A. M.
President

John Aloysius Lennon, S. J., A. M.
Dean of the Faculties

George Leonard Sullivan, M. E., Ph. D.
Dean of Engineering
Professor of Mechanical-Electrical Engineering

Cornelius Joseph McCoy, S. J., A. M.
Director of Discipline

Eugene Michael Bacigalupi, S. J., A. M.
Professor of Physics

Charles A. Budde, S. J., A. M.
Professor of Geology

Cornelius Francis Deeney, S. J., A. M., Ph. D.
Professor of Economics and Religion

Edward M. Fellows, Cert. Law
Professor of Business Law

Demetrius Wilbur Griswold, E. E.
Professor of Electrical Engineering

James J. Kelly, S. J., A. M.
Professor of Chemistry and Mathematics

James A. King, S. J., A. M.
Professor of English and Religion

William Dirvin Lotz, B. S.,
Professor of Civil Engineering

Peter John Mootz, S. J., A. M.
Professor of Philosophy

Albert Joseph Newlin, B. S., LL.B., J. D.,
Associate in Meteorology and Seismology

Jerome Sixtus Ricard, S. J., A. M.
Professor of Astronomy, Meteorology and Seismology

Daniel E. Sullivan, LL.B., LL. M.
Professor of Public Speaking

Ernest P. Watson, S. J., A. M.
Professor of Drawing

COLLEGE OF ENGINEERING

INTRODUCTION

The foundation of the College of Engineering in the University of Santa Clara was the result of repeated and urgent requests that opportunities should be given young men ambitious to follow the Engineering profession, to pursue and complete the studies leading to it in an environment and atmosphere conducive as well to deep persevering study as to cultural and moral development.

To meet this demand, the Faculty of the University has added sound and thorough courses in Civil, Electrical and Mechanical Engineering. As in all other departments of the University, the students are under the moral guidance of the Jesuit Fathers. The technical work of these departments is in the hands of experienced and practical engineers who devote their whole time and attention to the success of their work. As is traditional at Santa Clara, students in Engineering are given individual care, assistance, advice and encouragement. The work exacted is of the highest type; nevertheless, owing to this individual care and to the judicious admission of students as well as the prompt elimination from the various departments of students found to be inadequately prepared in fundamental studies or in seriousness of purpose, there is very little likelihood and no excuse for failure on the part of the student.

The engineer today must be more than a machinist, electrician or surveyor. He can no longer be a self-made man in the old sense. His mind must possess the acumen and culture which only a broad college training and college association can give, and his acquaintance with and love of mathematics and science should be the foundation on which his knowledge of their technical application is based.

This is the ideal which Santa Clara cherishes for the engineers who shall receive their education from her, and the notable work which her graduates are doing proves that this ideal leads to success.

COURSES—DEGREES

Courses are offered leading to the degrees of Bachelor of Science in Civil Engineering, Bachelor of Science in Electrical Engineering and Bachelor of Science in Mechanical Engineering. These courses aim, first, to give the student a thorough knowledge of the sciences on which all Engineering is based; second, to develop his ability to acquire accurate information; third, to develop his judgment by practical work so that he may be able to use his knowledge and information to the best advantage.

Civil Engineering covers the field of structural work (steel, concrete and stone buildings and bridges), municipal engineering (roads, pavements and sewers), water power development, irrigation and railroad construction. These are all based on the fundamental sciences of Mathematics, Physics and Chemistry, and as much practice as possible is given to facilitate the application of these sciences to professional work.

Electrical Engineering has to do with the design and construction of electrical machinery and the various applications of electricity to the arts. Electrical and Mechanical Engineering are so closely interrelated that the courses of the first three years are the same, and it is only the Senior courses, such as Telephony and pure Electrical design that are differentiated from the Mechanical Engineering courses.

Mechanical Engineering may be divided into three closely related lines, Design, Manufacturing and Power Generation. The courses in Design begin with mechanical drawing and continue with a study of mechanisms, strength of materials, stresses, adaptability, cost, and commercial worth of machines. Manufacturing has to do with the organization of commercial enterprise, systems of works management, efficiency systems, cost of materials and power and layout of machinery in a factory for maximum output. The subject of Power Generation is covered by courses on steam and gas engines, turbines, boilers, water motors and electric generators, together with the proper operation of all classes of machinery and the application of power to them.

ALUMNI SCIENCE HALL

The College of Engineering occupies the entire second floor of the new, reinforced concrete Alumni Science Hall; with offices, class rooms, drafting rooms, road and calorimeter laboratories, blue-print room, and library. The Physical and Chemical lecture rooms and laboratories are immediately adjacent on the other floors.

MONTGOMERY LABORATORIES

The Montgomery Laboratories, a new concrete building, houses the various engineering laboratories; including forge, wood shop, and pattern laboratories; materials testing laboratory; mechanical laboratory; offices, and class rooms for laboratory classes.

ENGINEERING SOCIETY

The Engineering Society, composed of students and faculty in the College of Engineering, supplements the class work by regular meetings for the discussion of engineering problems, with special lectures by engineers of prominence; by occasional social gatherings; and by such other student activities as are found advisable.

INSPECTION TRIPS

One important advantage of the University is its proximity to the many industrial establishments of the San Francisco Metropolitan district and this opportunity is taken advantage of by special trips to special industries. In this way students are given a practical insight into the working of these engineering industries.

STUDENT BRANCH: AMERICAN SOCIETY OF MECHANICAL ENGINEERS

A student branch of the A. S .M. E. has recently been established at the University and is open to students in Mechanical Engineering, for a discussion of current mechanical problems.

REQUIREMENTS FOR GRADUATION

In all groups of the College of Engineering, 152 credits are required for graduation. A credit is given for each one-hour recitation, or lecture, per week, carried satisfactorily for one semester, or for two hours per week, spent in laboratory, drawing room or shop. All regular students free from deficiencies in university work may register for 19 units of new work.

At least two summer vacations must be spent on engineering work before graduation. A detailed report of this work, containing at least three hundred words, must be handed to the Dean of the College of Engineering within one month of the opening of the first semester.

Before one is admitted to any degree a thesis must be submitted on a subject chosen by the student with the approbation of the Dean of the Faculties. It must bear on the matter studied or at least on cognate matter and must give evidence of original investigation of some engineering problem. It shall consist of no fewer than 5000 words and should be typewritten on paper 8½x11 inches. The submission of an acceptable thesis is an absolute prerequisite to admission to final examinations. The ultimate decision as to whether the effort merits the degree rests with the Committee on Theses.

Residence of at least one year immediately preceding graduation is required for the granting of any degree.

SCHEDULE OF COURSES

CIVIL ENGINEERING

Freshman Year

First Semester

	Hours Attendance Recitation	Laboratory	Units
College Algebra (Math. 11)	3		3
Trigonometry (Math. 12)	2		2
Chemistry (Chem. 11, 12)	2	4	4
Mechanical Drawing (G. E. 1)		6	3
Public Speaking (Pub. Speak. 11)	1		1
English (Eng. 11)	3		3
Review of Engineering Industries (G. E. 9)	1		1
Surveying (C. E. 1)	1	2	2
Religion (Religion 11)	2		1

Second Semester

Analytic Geometry (Math. 13)	5		5
Chemistry (Chem. 13, 14)	2	4	4
Descriptive Geometry (G. E. 2)	1	4	3
English (Eng. 12)	3		3
Public Speaking (Pub. Speak. 12)	1		1
Review of Engineering Industries (G.E. 9a)	1		1
Surveying (C. E. 2)	1	2	2
Religion (Religion 12)	2		1

Sophomore Year

First Semester

Calculus (Math. 14)	4		4
Technical Mechanics (G. E. 7)	3		3
Physics (Phys. 11, 12)	2	4	4
Geology (Geol. 33)	3		3
Field Engineering (C. E. 3)	1	2	2
Drawing (C. E. 12)		2	1
English (Eng. 13)	3		3
Religion (Religion 13)	2		1

Second Semester

Calculus (Math. 15)	4		4
Technical Mechanics (G. E. 8)	3		3
Physics (Phys. 13, 14)	2	4	4
Mineralogy (Geol. 34)	3		3
Field Engineering (C. E. 4)	1	2	2
Drawing (C. E. 13)		2	1
English (Eng. 14)	3		3
Religion (Religion 14)	2		1

SCHEDULE OF COURSES

CIVIL ENGINEERING

Junior Year

First Semester

	Hours Attendance Recitation	Laboratory	Units
Mechanics of Materials (G. E. 109)	4		4
Graphics (C. E. 118)	2	4	4
Differential Equations (Math. 116)	2		2
Structural Design (C. E. 114)	3	2	4
Materials Testing Laboratory (G. E. 110)		2	1
Philosophy (Philos. 111)	3		3
Religion (Religion 111)	2		1

Second Semester

Hydraulics (G. E. 121)	3	2	4
Electricity (E. E. 114)	2	2	3
Graphics (C. E. 119)	2	2	3
Masonry (C. E. 120)	3		3
Structural Design (C. E. 115)		4	2
Philosophy (Philos. 112)	3		3
Religion (Religion 112)	2		1

Senior Year

First Semester

Stresses (C. E. 122)	4		4
Roads and Pavements (C. E. 124)	1	2	2
Sanitary Engineering (C. E. 125)	3		3
Concrete and Reinforced Concrete (C. E. 127)	3		3
Design (C. E. 116)	2	6	5
Philosophy (Philos. 113)	3		3
Religion (Religion 113)	2		1

Second Semester

Stresses (C. E. 123)	4		4
Economics (Econ. 111)	1		1
Business Law (Law 111)	1		1
Sanitary Engineering (C. E. 126)	3		3
Railway Construction (C. E. 130)	2		2
Estimates and Specifications (G. E. 131)	2		2
Design (C. E. 117)		4	2
Philosophy (Philos. 114)	3		3
Religion (Religion 114)	2		1
Technical Literature (G. E. 127)	1		1

SCHEDULE OF COURSES

ELECTRICAL AND MECHANICAL ENGINEERING

Freshman Year

First Semester

	Hours Attendance Recitation	Laboratory	Units
College Algebra (Math. 11)	3		3
Trigonometry (Math. 13)	2		2
Chemistry (Chem. 11, 12)	2	4	4
Mechanical Drawing (G. E. 1)		6	3
English (Eng. 11)	3		3
Public Speaking (Pub. Speak. 11)	1		1
Review of Engineering Industries (G. E. 9)	1		1
Shopwork (M. E. 10)		2	1
Religion (Religion 11)	2		1

Second Semester

Analytic Geometry (Math. 13)	5		5
Chemistry (Chem. 13, 14)	2	4	4
Descriptive Geometry (G. E. 2)	1	4	3
English (Eng. 12)	3		3
Public Speaking (Pub. Speak. 13)	1		1
Review of Engineering Industries (G.E. 9a)	1		1
Shopwork (M. E. 11)		2	1
Religion (Religion 12)	2		1

Sophomore Year

First Semester

Calculus (Math. 14)	4		4
Technical Mechanics (G. E. 7)	3		3
Physics (Phys. 11, 12)	2	4	4
Kinematics (M. E. 3)	2		2
English (Eng. 13)	3		3
M. E. Laboratory (M. E. 15)		4	2
Shopwork (M. E. 12)		2	1
Religion (Religion 13)	2		1

Second Semester

Calculus (Math. 15)	4		4
Technical Mechanics (G. E. 8)	3		3
Physics (Phys. 13, 14)	2	4	4
Drawing (M. E. 4)	1	4	3
English (Eng. 14)	3		3
Shopwork (M. E. 13)		2	1
Religion (Religion 14)	2		1

SCHEDULE OF COURSES

ELECTRICAL AND MECHANICAL ENGINEERING

Junior Year

First Semester

	Hours Attendance Recitation	Laboratory	Units
Mechanics of Materials (G. E. 109)	4		4
Machine Design (M. E. 105)		4	2
Boilers (M. E. 118)	2		2
Electrical Measurements (Phys. 104)		2	1
Electrical Machinery (E. E. 101)	2		2
Differential Equations (Math. 116)	2		2
E. E. Laboratory (E. E. 109)		4	2
Materials Testing Laboratory (C. E. 110)		2	1
Shopwork (M. E. 114)		2	1
Philosophy (Philos. 111)	3		3
Religion (Religion 111)	2		1

Second Semester

Hydraulics (G. E. 121)	3	2	4
A. C. Machinery (E. E. 102)	3		3
Steam and Gas Machinery (M. E. 119)	3		3
E. E. Laboratory (E. E. 110)		4	2
Machine Design (M. E. 106)	2	4	2
M. E. Laboratory (M. E. 116)		2	1
Shopwork (M E. 114a)		2	1
Surveying (C. E. 132)		2	1
Masonry (C. E. 120)	3		3
Philosophy (Philos. 112)	3		3
Religion (Religion 112)	2		1

SCHEDULE OF COURSES

ELECTRICAL ENGINEERING

Senior Year

First Semester

Thermodynamics (M. E. 120)	3		3
Industrial Engineering (M. E. 123)	2		2
Electrical Design (E. E. 106)		4	2
Structural Design (C. E. 114)	3	2	4
Alternating Currents (E. E. 103)	3		3
E. E. Laboratory (E. E. 111)		4	2
Philosophy (Philos. 113)	3		3
Religion (Religion 113)	2		1

Second Semester

Power Plant Design (E. E. 107)	2	4	4
Alternating Currents (E. E. 104)	3		3
Electrical Design (E. E. 108)		4	2
E. E. Laboratory (E. E. 112)		2	1
Hydraulic Motors (M. E. 122)	2		2
Business Law (Law 111)	1		1
Estimates and Specifications (G. E. 131)	2		2
Economics (Econ. 111)	1		1
Technical Literature (G. E. 127)	1		1
Philosophy (Philos. 114)	3		3
Religion (Religion 114)	2		1

SCHEDULE OF COURSES

MECHANICAL ENGINEERING

Senior Year

First Semester

Thermodynamics (M. E. 120)	3		3
Industrial Engineering (M. E. 123)	2		2
Alternating Currents (E. E. 103)	3		3
Machine Design (M. E. 107)		4	2
Structural Design (C. E. 114)	3	2	4
M. E. Laboratory (M. E. 117)		4	2
Philosophy (Philos. 113)	3		3
Religion (Religion 113)	2		1

Second Semester

Technical Literature (G. E. 127)	1		1
Power Plant Design (M. E. 108)	2	4	4
Alternating Currents (E. E. 104)	3		3
Electric Transmission (E. E. 115)	2		2
Estimates and Specifications (G. E. 131)	2		2
Economics (Econ. 111)	1		1
Business Law (Law 111)	1		1
Elective			2
Philosophy (Philos. 114)	3		3
Religion (Religion 114)	2		1

DESCRIPTION OF COURSES

CIVIL ENGINEERING

Courses for Undergraduates

C. E. 1. **Surveying.** Theory, construction, use and adjustments of tape, compass, level and transit. Land and city surveying. Plotting, field work and computation of areas. Division of land. Simple leveling. Complete maps. Practical field work covering all matter taught in class work. The object is to familiarize thoroughly the student with the instruments and with field conditions. Field notes. Field maps. Topographical sketching without instruments. Breed & Hosmer's Principles & Practice of Surveying. Pence and Ketchum, Surveying Manual. One hour Lecture, two hours Laboratory.

Prerequisite: Math. 12. Two units.

C. E. 2. **Surveying.** Continuation of C. E. 1. Breed & Hosmer's Principles & Practice of Surveying. One hour Lecture, two hours Laboratory. Second semester.

Prerequisite: C. E. 1. Two units.

C. E. 3. **Field Engineering.** Leveling, contour lines, hachures, cross-section work. Use of plane table. Maps of work. Stadia. Transit Stadia. City, mine, hydrographic and topographic surveying. Engineering office work. Plotting profiles and cross-sections. Calculations of areas. Computation of volumes of earth work and masonry. Draughting field notes. Excavation methods in different materials. Estimate of cost. Overhaul. Application to canals, trenches, embankments, dredging, etc. Practical surveying in the field under all the heads in the scope of the work in class. Notes. Calculations. Conditions are made as nearly those of a corps in the field as possible, each student being required to fill every position in turn. Breed & Hosmer's Principles & Practice of Surveying. One hour Lecture, two hours Laboratory. First semester.

Prerequisite: C. E. 2. Two units.

C. E. 4. **Field Engineering.** Reconnaissance. Location, preliminary survey and grade stakes for highways, canals and railways. Plots and calculations from notes. Theory of railway curves; simple, compound and taper curves. Locating side-tracks, switches, yards. Cross sectioning. Triangulation. The work is made as nearly practical as possible and covers the theories and principles taught in class work. Breed & Hosmer's Principles & Practice of Surveying. Allen's Railroad Curves and Earthwork. One hour Lecture, two hours Laboratory. Second semester.

Prerequisite: C. E. 2 Two units.

C. E. 12. Drawing. Shading of lines and colors. Topographical drawing and lettering. Conventional signs, etc. Maps of work done in field. Complete maps in pencil, pen and colors. Blue prints. Tracing structural details. Daniel's Topographical Drawing. Two hours Drawing. First semester.

Prerequisite: C. E. 1. One unit.

C. E. 13. Drawing. Continuation of C E. 12. Text as in C. E. 12. Two hours Drawing. Second semester.

Prerequisite: C. E. 12. One unit.

Courses for Advanced Undergraduates and Graduates

C. E. 114. Structural Design. The Design and Detailing of a Reinforced Concrete Retaining Wall, Culvert, Pier and Abutment, a Steel Roof Truss, a Timber Roof Truss. Full computations of stresses must be submitted together with finished drawings and estimate of quantities. Definite conditions are given from which the design must be evolved by the student. Ketchum's Structural Engineers' Handbook. Bishop's Structural Drafting. Dewell's Timber Framing. Three hours Lecture, two hours Drawing. First semester.

Prerequisite: Must be taking G. E. 110. Four units.

C. E. 115. Structural Design. Continuation of C. E. 114. Baker and Current Publications of New Structures. Four hours Drawing.

Prerequisite: C. E. 114. Two units.

C. E. 116. Design. The Design and Detailing of a Railway Plate Girder, a Steel Truss Bridge, a Reinforced Concrete Girder, and a Reinforced Concrete Arch Bridge. The actual size of each structure is assigned in each problem. Merriman and Jacoby's Roofs and Bridges Vol. 3. Hool's Reinforced Concrete Construction Vol. 3. Two hours Lecture, Six hours Drawing. First semester.

Prerequisite: Must be taking C. E. 127. Five units.

C. E. 117. Design. Continuation of C. E. 116. Second semester. Four hours Drawing.

Prerequisite: C. E. 116. Two units.

C. E. 118. Graphics. Principles and Methods. Application to roof trusses under dead, snow and wind loads. Complete stresses for triangular and crescent trusses. Unsymmetrical loads for trusses. Bridge trusses. Stress due to dead, snow, wind, initial tension and live loads. Bowstring trusses, Stress loads, Locomotive wheel loads. Plate girders. Shears. Moments. Trusses with broken chords. Miscellaneous trusses. Elastic deformation of trusses. Application to other engineering structures. Merriman and Jacoby's Graphic Statics. Two hours Lecture, four hours Laboratory. Four units.

C. E. 119. Graphics. Continuation of C. E. 118. Text as in C. E. 118. Two hours Lecture, two hours Laboratory Second semester.
Prerequisite: C. E. 118. Three units.

C. E. 120. Masonry. The Non-Metallic Materials: their strength, durability, occurrence, testing and uses. Plain Concrete: selection of aggregates, proportioning, mixing and placing for maximum strength and density. Forms. Reinforced Concrete: general principles and assumptions involved in the theory, development and application of formulae for rectangular and T beams, simple and continuous, for beading, diagonal tension, bond, etc.; plain, spiral and hooped columns. Stone and Brick Masonry. Waterproofing. Foundations on Land: bearing capacity and methods of improving it, safe loads, design and arrangement of footings, piles and pile driving, safe loads on piles. Foundations under Water: coffer dam, crib, open caisson, pneumatic, and freezing processes, dredging through wells, pumping, the effect of compressed air. Masonry Walls and Dams; lateral pressure of water and earth, stability, internal stresses, investigation, design, construction details. Bridge Abutments and Piers. Culverts. The Voussier Arch: general data, methods of failure, stability, static analysis. Baker's Treatise on Masonry Construction. Urquhart & O'Rourke's Design of Concrete Structures. Three class hours. First semester. Three units.

C. E. 126. Sanitary Engineering. Engineering in general. stresses in members of roof trusses. Different types of loads. Final stresses in roof trusses. The evolution of present types of highway and railway bridge trusses. Stresses due to dead, live and wind loads, impact and traction on all members of simple bridges. Text: Merriman & Jacoby's Roofs & Bridges. Vol. 1. First semester. Four class hours. Four units.

C. E. 123. Stresses in Structures. Elementary Indeterminate forms. The properties of continuous beams and rigid frames derived from, (a) the double integration of the differential equation of the elastic line; (b) the equations derived from the laws of work, and (c) the principle of area moments. Deflections in structures with open webs. Stresses in redundant members. Arches with solid and open webs. Moveable bridges. Text: Hudson's Deflections and Statically Indeterminate Stresses. Four hours. Second semester.
Prerequisite: C. E. 122. Four units.

C. E. 124. Roads and Pavements. Different types of highways. Economic location of highways. Traction resistance. Gradients. Foundations. Preparing foundations. Drainage. Standard cross-sections. Natural, broken stone and other artificial roads. Materials and their adaptability to classes of traffic. Road coverings. Asphalts. Asphaltenes and patented road coverings. Concrete. Oils. Oiled roads. Dust prevention. Maintenance and repairs. Pavements. Paving materials. City streets. Width and cross-section, crown, gutters, curbs, footwalks and crossings. Street intersection and grades. Standard city streets and street railway construction. Repairs. Lectures on improvement and changes in highway construction. Agg's Roads and Pavements; Bulletins from Office of Public Roads, U. S. Dept. of Agriculture. One hour Lecture, two hours Laboratory. First semester. Two units.

C. E. 125. Sanitary Engineering. Rainfall and run-off. Estimating future population. Amount of sewage per capita, Ground water, Grades and Velocities, Sewerage systems, Cross-sections, Flushing. The meaning of chemical analyses of water and sewage. Bacteria and their relation to sewage disposal and water purification. Texts: Ogden's Sewer Design; Fuller's Sewage Disposal. Three hours. First semester. Three units.

C. E 126. Sanitary Engineering. Engineering in general. Value, cost and returns. Drainage areas. Estimation of rainfall and discharge from drainage areas. Water units and duty. Streams, flow and discharge. Measuring devices. Canals and ditches; construction; alignment, slope and cross-section. Distribution. Application of water in irrigation. Storage work. Water supply and losses. Geological conditions affecting reservoir sites. Earth and masonry dams. Details of headworks, diversion, weirs, waste ways, sluices and regulators. Pumping machinery. Maintenance. Water rights. Irrigation laws. Newell and Murphy's Principles of Irrigation Engineering

Drinking water and disease. Artificial methods of water purification. Natural purification. Properties of waters from Snow, Rivers, Lakes or reservoirs, Wells, etc. Per capita consumption. Texts: Newell & Murphy's Principles of Irrigation Engineering; Mason's Water Supply. Three class hours. Second semester. Three units.

C. E. 127. Reinforced Concrete. The Chemistry and Testing of Cements and Aggregates. A short review of: Voids and Other Characteristics of Aggregates; Laying Concrete and Mortar in Freezing

Weather; the effect of Sea water and other Destructive Agencies; Water tightness and Strength of Concrete. Advanced Theory and formulae for:—Members under flexure and direct stress; Hollow and Wedge shaped beams; Flat slabs; Rigid frames; Temperature, shrinkage and settlement stresses. A critical and comprehensive review of the principal tests made on reinforced concrete structures intended to develop the student's judgment and lead to a clear understanding of modern design specifications. Specifications for the Design of Reinforced Concrete. Building Codes. Building Construction. Beam and Girder Bridges. The Elastic Arch. Taylor & Thompson's Concrete, Plain and Reinforced. Hool's Reinforced Concrete Design, Vol. III. Three hours. First semester. Three units.

C. E. 128. **Tunneling.** Classification of tunnels. Locating tunnels. Economic location. Different methods employed in tunnels under various soil conditions Excavating. Removal of excavations. Blasting. Powders. Drills and machinery used. Economic distribution of forces. Heading and bench. Linings in wood, brick, concrete and reinforced concrete. Drainage. Ventilation. Rapid transit system. City subway work and methods. Stauffer: Modern Tunnel Practice. Two class hours. First semester. Two units.

C. E. 130. **Railway Construction.** Much of the course is also adapted to the construction of canals, highways, levees, etc. Reconnaissance. Location. Alignment, grade and distances. Parties. Staking out work. Grading. Organization of grading parties. Methods of grading. Machines, etc. Output of men, animals and machines. Volumes. Cut and fill. Overhaul. Finishing. Revetments. Drainage, areas and waterways. Culverts, size and character. Tracklaying. Tracklaying machines. Surfacing. Ballast. Single and double track roads. Side tracks, switches, crossings and yards. Round Houses. Shortening lines. Operating expenses. Maintenance. General land extra gangs. Camp hygiene. Right of way. This course is largely lecture work, using standard text-books and writings. Raymond's Railway Engineering. Two class hours. Second semester. Three units.

C. E. 132. **Surveying.** Use and adjustment of tape, level and transit. For Electrical and Mechanical Engineers. Pence & Ketchum's Surveying Manual. Two hours Laboratory. Second semester. One unit.

C. E. 170. **Thesis and Seminar.** Original investigation of some Engineering problem.

ELECTRICAL ENGINEERING

Courses for Undergraduates

11. Electricity. Definitions. Coulomb's Law. Electromagnetism. Ohm's Law. Electric circuits and resistance. Generators. Motors—Losses, Heating and Efficiency. Gray's Principles and Practice of Electrical Engineering. Two class hours. One semester.
Prerequisite: Sophomore standing. Two units.

Courses for Advanced Undergraduates and Graduates

E. E. 101. Electrical Machinery. Magnetic field. Magneto-motive force. Hysteresis. Elementary dynamo. The magnetic circuit. Armature core. Commutator. Brush shifting. Sparking at brushes and remedies. Different types of generators. Methods of transmitting, distributing and controlling direct current. Direct current series and parallel systems. Feeders and mains. High tension D. C. systems. Timbie and Bush's Principles of Electricity. Two class hours. First semester.
Prerequisite: Physics 13, 14. Two units.

E. E. 102. Alternating Currents. Self and mutual inductance. Capacity. Impedance. Phase angle and power factor. Series and repulsion types. Synchronous motors. Induction motors, single and polyphase. Methods of starting. Speed control. Electric drive for cranes, elevators, presses, pumps, fans, mill-work, etc. Timbie and Higbie's Alternating Current Electricity. First Course. Three class hours. Second semester.
Prerequisite: Physics 12 and E. E. 101. Three units.

E. E. 103. Alternating Current Machinery. Electric power systems. Translating, controlling and transmitting equipment. Constant potential and constant current transformers. Efficiency, regulation and protection. Polyphase systems of generation. Two phase and three phase and conversion from one system to another. Calculation of alternating current transmission lines. Regulation of voltage. Power factor of systems. Switch-boards. Apparatus used on Switch-boards. Location. Types. Pole lines. Cable and conduit systems. Timbie and Higbie's Alternating Current Electricity. First course. Three class hours. First semester.
Prerequisite: E. E. 102. Three units.

E. E. 104. Alternating Current Machinery. Continuation of E. E. 103. Timbie and Higbie's Alternating Current Electricity, Second Course. Lawrence's Alternating Current Machinery. Three class hours. Second semester. Three units.

E. E. 105. Telephony. The magneto-telephone The microphone. Carbon transmitters. Induction coils. Call methods Series and parallel circuits. Subscribers' equipment. Line disturbances. Common battery systems. Exchange equipment. Party lines. Automatic systems. Combined telegraphy and telephony. Wireless telegraphy. Generation of electrical waves. Transmitting and receiving apparatus. Electrical Engineer's Handbook. One class hour. First semester.

Prerequisite: Physics 12 and E. E. 101. One unit.

E. E. 106. Design of Direct Current Machinery. Electrical and mechanical theory applied to the design of D. C. machinery. Switches, heaters, controllers, etc. Complete calculations and working drawings for a dynamo or motor, to fulfill given specifications. Still's Electric Machinery Design. Four hours Drawing. First semester.

Prerequisite: E. E. 101. Two units.

E. E. 107. Power Plant Design. Design of a complete plant to furnish light and power for a city of given size. Consideration of the elements: illumination, charges, operating expenses, income, organization and administration, reports, specifications, contracts and statistics. Weingreen's Electric Power Plant Engineering. Two hours Lecture, four hours Drawing. Second semester.

Prerequisite: E. E. 103-106. Four units.

E. E. 108. Electrical Design. Design of alternators, transformers, induction motors and other alternating current apparatus. Thorough investigation and complete design of some unit assigned. Still's Electric Machinery Design. Four hours Drawing. Second semester. Two units.

E. E. 109. Electrical Engineering Laboratory. Determination of the resistance of electrical circuits. Relation between speed, field strength and voltage. Operation of shunt series and compound-wound generators. Distribution of potential around commutator. Heat runs to determine load capacity. Stray power. Starting boxes. Counter electro-motive force. Shunt, series, compound and differentially wound motors. Operation of shunt and compound wound generators in parallel. Distribution of load. Control of series circuits. Regulation of arc lamps. Constant potential and constant current generators. Wilson's Dynamo Laboratory Outlines and References. Four Hours Laboratory. First semester.

Prerequisite: Must be taking E. E. 101. Two units.

E. E. 110. Electrical Engineering Laboratory. Calibration of ammeters and voltmeters. Calibrations and adjustments of A. C. and D. C. watt-hour meters. Determination of resistances. Measurement of inductance and capacity. Permeability of samples of iron and steel. Determination of hysteresis. Storage Batteries. Testing. Candlepower of lamps from standard candle. Cable testing. Insulation resistance. Practice in operation of A. C. motors, generators and other apparatus. Four hours Laboratory. Second semester. Two units.

E. E. 111. Electrical Engineering Laboratory. Alternating current circuits. Inductance, capacity, impedance, phase, relation, true and apparent watts and power factor. Alternators. Magnetization curves. Losses and synchronous impedance. Synchronous motors. Methods of Synchronizing. Methods of starting rotary converters. Compounding. Calculation of efficiency. Alternators in parallel. Transformers. Regulation. Heating and Efficiency. Use as induction regulators and phase changers. Wave shapes by instantaneous contact and by the oscillograph. Resonance. Methods of starting induction motors. Efficiency by brake tests. Operation of induction generator. Reports of complete tests on plants. Four hours laboratory. First semester. Two units.

E. E. 112. Electrical Engineering Laboratory. Continuation of E. E. 111. Two hours Laboratory. Second semester
Prerequisite: E. E. 111. One unit.

E. E. 114. Electricity. A short course similar to E. E. 101 and E. E. 109 for Civil Engineering Students. Gray's Electrical Engineering. Two hours Lecture, two hours Laboratory. Second semester. Three units.

E. E. 115. Electric Power Transmission. Electric principles and theory. Economic principles and calculations. Insulation of overhead lines. Transient phenomena. Underground lines. Mechanical design of transmission lines. Still's Electrical Transmission. Two class hours. Second semester. Two units.

E. E. 116. Radio. Fundamental Ideas and Laws. Resistance, Inductance and Capacity. Laws of Oscillating currents. Spark Telegraphy. Vacuum Tubes and their operation on typical circuits. Continuous-wave telegraphy. Radio Telephony. Wavemeters and their use. Morecroft's Principles of Radio Communication. Two class hours. One semester. Two units.

E. E. 170. Thesis and Seminar. Original investigation of some Engineering problem.

ECONOMICS

Courses for Advanced Undergraduates and Graduates

111. **Economics.** Object. Production, distribution, circulation and consumption of wealth. Production of wealth. Earth and natural agents. Labor and industry. Capital. Distribution of wealth. Individual property. Share of laborers. Circulation of wealth. Exchange. Taxes. Applications. This course is designed to give the student a broader view of his standing as a professional man in the community. One class hour. Second semester. One unit.

For additional courses in Economics, Sociology, Political Science, and Business Administration see the Bulletins of the Colleges of Liberal Arts, and Business Administration.

ENGLISH

11. **Composition and Rhetoric.** Lectures and recitations. The invention, arrangement and presentation of material. The different species of historical, philosophical, scientific, critical, etc., masterpieces. Three class hours. First semester. Three units.

12. **Composition and Rhetoric.** Continuation of Eng. 11. Three class hours. Second semester.

Prerequisite: Eng. 11. Three units.

13. **Rhetoric and Literature.** A course in English Rhetoric and Literature. Students who show any deficiency in English are required to take, in addition, the course in Special Composition. One hour a week is devoted to the study of Engineering Literature Three class hours. First semester. Three units.

14. **Rhetoric and Literature.** Continuation of 13. Three class hours.

Prerequisite: Eng. 13. Three units.

PUBLIC SPEAKING

11. **Fundamentals of Expression.** A short course in expression intended primarily for students in the College of Engineering. Fundamentals of expression; the speaking voice; expressive movement; impersonation; interpretation. Each student must report on memorized work at each class. One hour. First semester. One unit.

12. **Fundamentals of Expression.** A continuation of Course 11. One hour. Second semester.

Prerequisite: Public speaking 11. One unit.

GENERAL ENGINEERING

Courses for Undergraduates

G. E. 1. Mechanical Drawing. Freehand lettering. Use of instruments. Plane problems. Freehand sketching. Orthographic, isometric and cabinet projections. Tracing and blue printing. French's Engineering Drawing. Six hours Drawing. First semester.
Three units.

G. E. 2. Descriptive Geometry. Orthographic projection of points, lines, planes, warped surfaces, etc., in the four angles of projection. Intersections. Tangents to curves and surfaces. Developments. Practical problems in stereotomy, surveying, architecture, belting, layouts, etc. Cutter's Practical Descriptive Geometry. One hour Lecture, four hours Drawing. Second semester.
Prerequisite: G. E. 1. Three units.

G. E. 7. Technical Mechanics. General theories and principles concerning matter, inertia, space and time, motion, velocity and acceleration. Momentum. Force. Measures. Comparison and representation of force. Statics: Composition and resolution of concurring forces. Conditions of equilibrium. Composition and resolution of forecasting on a rigid body. Center of gravity. Friction. Virtual velocities. Machines. Funicular polygon. Attractions. Rectilinear and curvilinear motion. Kinetics. Laws of motion. Motion under the action of a variable force, and in a resisting medium. Central forces. Constrained motion. Impact. Work and energy. Moments of inertia. Rotary motion. Motion of a system of rigid bodies in space.

Effort is made throughout the course to direct the attention of the student to practical application of mathematical deductions. This course must accompany Physics 11-14. Poorman's Applied Mechanics. Three class hours. First semester.
Prerequisite: Math. 13. Three units.

G. E. 8. Technical Mechanics. Continuation of G. E. 7. Text as in G. E. 7. Three class hours. Second semester.
Prerequisite: G. E. 7. Three units.

G. E. 9. Review of Engineering Industries. Lectures and assigned reading on Engineering studies and work. This course is designed to teach the student how to study and to enable him to make a rational choice of a course of study. One class hour. First semester.
One unit.

G. E. 9a. Review of Engineering Industries. Continuation of G. E. 9. One class hour. Second semester One unit.

Courses for Advanced Undergraduates and Graduates

G. E. 109. Mechanics of Materials. Resistance and elasticity of materials. Pipes, cylinders and riveted joints. Simple and cantilever beams. Restrained and continuous beams. Columns, shafts and girders and their design. Torsion in shafts. Combined stresses. Strength and resilience of materials. Tension and compression. Flexure of beams. Shear and torsion. Apparent and true stresses. Plates, spheres and columns. Analytical and graphical methods used in the solution of problems. Seeley's Resistance of Materials. Four class hours. First semester.

Prerequisite: Math. 5 and G. E. 8. Four units.

G. E. 110. Materials Testing Laboratory. Tests of iron, steel, wood and concrete in tension, compression, shear, bending and torsion. Rattler tests on brick, and standard tests on road materials. Text Hatt & Scofield's Laboratory Manual of Testing Materials. Two hours Laboratory. First semester.

Prerequisite: Must be taking G. E. 109. One unit.

G. E. 121. Hydraulics. Fundamental data. Hydrostatics. Theoretical hydraulics. Instruments and observations, especially meters and pressure gauges. Flow through orifices. Flow over weirs. Flow through tubes and pipes. Flow in conduits. Flow in rivers. Water-supply and water power. Dynamic pressure of water. Water wheels. Overshot, breast, undershot, vertical impulse, horizontal impulse and downward flow impulse wheels. Special forms of wheels. Turbines. Classification. Theory and design of turbines. Downward-flow and impulse turbines. Special devices. Naval hydro-mechanics. Pumps and pumping. Force and centrifugal pumps. Pumping engines. Other kinds of pumps. Pumping through pipes, and through hose. Hydraulic motors. Hydraulic-electric analogies. Stress is laid upon the effect of hydraulic laws upon engineering construction or under water, especially in problems involving the impounding of water or oil. Daugherty's Hydraulics. Three hours Lecture, two hours Laboratory. Second semester. Four units.

G. E. 127. Technical Literature. Reading and reports from current Engineering literature. One class hour. Second semester. One unit.

G. E. 131. Estimates and Specifications. Principally a lecture course, but supplemented by practical problems for which estimates and specifications must be submitted. Position of engineer in construction. Duties. Estimates. Corrections. Latitude allowed. Contracts. General kinds. Special. Specifications. Definiteness. Lectures on law of contracts. Kirby's Elements of Specification Writing. Two class hours. Second semester. Two units.

GEODESY

126. Geodesy and Astronomy. Class, field and observatory work. Methods of field work to obtain accurate results. Construction, use and correction of errors in instruments. Observatory determination of latitude, longitude, azimuth and time. Field work in determining parallels and meridians. Latitude and azimuth. Transit, altazimuth and sextant, and their use. Solar transit. Triangulations and adjustments. Compass variations. Especial attention is directed to the use and correction of engineering instruments and their adaptability to astronomical use. Crandall's Text Book on Geodesy and Least Squares. Two hours Laboratory. First semester. One unit.

GEOLOGY AND MINERALOGY

Geology 33. A course in dynamical, structural and historical Geology. Particular attention is paid to structural Geology and the influences of Constructive and Engineering conditions. The student is made familiar with different stones by illustrating each recitation with specimens of the particular rocks treated, as well as their adaptability in construction, method of occurrence, etc. Ries and Watson's Engineering Geology. Three class hours. First semester.
Three units.

Geology 34. Mineralogy. A course in Mineralogy with access to a large collection of specimens. Determination of unlabeled specimens. Crystallography. Blowpipe analysis. Includes a short course in Metallurgy. Iron ores and production of iron and steel. Percentage and effects of sulphur, silicon manganese and carbon in iron and steel. Coals, coke, carbons and ash. Text as in 1. Three class hours. Second semester.
Prerequisite: Geology 1. Three units.

HISTORY

For courses in History see Bulletin of the College of Liberal Arts, Department of History.

LAW

111. Business Law. A brief course in Contracts, Sales, Negotiable Instruments, Real Estate, Partnership, Corporations and such other subjects as may be selected. Allen's Business Law for Engineers. One class hour. Second semester. One unit.

For additional courses in Law see Bulletins of the Colleges of Liberal Arts and Business Administration, and of the Institute of Law.

MATHEMATICS

Courses for Undergraduates

11. Algebra. Complete Algebra to include quadratic equations; then more particularly; ratio and proportion, progressions, imaginary and complex numbers, indeterminate equations, binomial theorem, variables and limits, inequalities, interpretation of results, logarithms, permutations and combinations, undetermined coefficients, determinants and graphic algebra. Brenke's Advanced Algebra and Trigonometry. Three class hours. First semester. Three units.

12. Trigonometry. Development of general formulae. Functions and their relations. Logarithms and their uses. Properties of triangles. Application of principles to practical problems in right and oblique triangles. Navigation in plane trigonometrical problems. Spherical trigonometry. Application to problems in astronomy and spherical mensuration. Brenke's Advanced Algebra and Trigonometry. Two class hours. First semester. Two units.

13. Analytic Geometry. Loci. Lines. Circle. Different systems of co-ordinates. Conic sections. Supplementary proportions. Loci of second order. Plane curves of higher order. Solid analytical geometry, especially of revolution. General equations. Riggs' Analytic Geometry. Five class hours. Second semester.

Prerequisite: Math 11 and 12. Five units.

14. Calculus. Fundamental formulae and principles for differential and integral calculus. Maxima and minima. Curvature. Surfaces. Volumes. Intermediate forms. Envelopes. Series Expansion. Forms of integration. Practical application. Townsend and Goodenough's Calculus. Four class hours. First semester.

Prerequisite: Math. 13. Four units.

15. Calculus. Continuation of 14. Four class hours. Second semester.

Prerequisite: Math. 14. Four units.

Courses for Advanced Undergraduates and Graduates

116. Differential Equations. Analysis and deduction of formulae and equations used in physics, mechanics and engineering problems. Applications of formulae and equations given in engineering handbooks to problems. Practical problems and lectures. Campbell's Differential Equations. Two class hours. Second semester.

Prerequisite: Math. 15. Two units.

117. Method of Least Squares. Study of the principles and methods. Application to problems. Merriman's Method of Least Squares. Two class hours. Second semester. Two units.

MECHANICAL ENGINEERING

Courses for Undergraduates

M. E. 3. Kinematics. Motion, velocity and acceleration of machine parts. Rolling cylinders and cones. Lobed wheels. Belts. Levers, Cams, Linkwork. Gearing. Parallel and straight line motion. Intermittent linkwork. Aggregate combinations. Keown's Mechanism and James and Dole's Mechanism of the Steam Engine. Two class hours. First semester.

Prerequisite: G. E. 1. Two units.

M. E. 4. Machine Drawing. Language of Mechanical Drawing. Conventional method of representing bolts, screws and other standards. Piping. Designing and detailing simple parts to take tension, compression and shear. Study of different methods of drawing and dimensioning found on commercial working drawings. Accuracy, completeness and speed are required. French's Engineering drawing. One hour Lecture, four hours Drawing. Second semester.

Prerequisite: M. E. 3. Three units.

M. E. 10. Shopwork. Woodworking. Shop clerical work and time study. Proper use and care of bench tools. Exercises in planing, squaring and simple joinery. Layout of all work from blueprints.

Woodturning. Operation and care of turning lathe and tools. Exercises in woodturning and finishing. Two hours Laboratory. First semester. One unit.

M. E. 11. Shopwork. (a) Forging. Management of the forge fire. Exercises in Drawing, Upsetting, Shaping, Swaging and welding. Hardening and tempering. Forging characteristics of different grades of iron and steel. Harcourt's Forge Practice.

(b) Patternmaking. Operation and care of power wood working machinery. Theory of patternmaking and moulding. Construction of simple wood patterns and core boxes. All work laid out from blue-prints. Two hours Laboratory. Second semester. One unit.

M. E. 12. Shopwork. Foundry practice. Floor and bench moulding. Casting of brass, bronze and alloys. Dry and green sand core work. Core making. Shop visits. Tate & Stone's Foundry Practice. Two hours Laboratory. First semester.

Prerequisite: M. E. 11. One unit.

M. E. 13. Shopwork. (a) Patternmaking. Continuation of M. E. 11.

(b) Advanced practice in all types of woodpatterns and core boxes. All layouts from working drawings.

(c) Machine shop practice. Operation and care of metal working machinery. Machining, drilling, chipping and filing. Calipering, gauging and fitting. Assembling and rigging. Shop visits. Two hours Laboratory. Second semester.

M. E. 15. Mechanical Engineering Laboratory. Method of investigation. Classification of errors. Accuracy of numerical calculations. Autographic diagrams. Calibration of pressure gauges, thermometers, pyrometers, indicator springs, tachometers, planimeters, weirs, nozzles, orifices, pitot tubes, Venturi meters and dynamometers. Testing of lubricants. Density, viscosity, gumming, fire test and cold test. Measurement of power by the prony brake, Alden brake, traction dynamometers and transmission dynamometers. Belt testing. Measurement of flow of liquids and gases by means of meters, nozzles, pitot tubes, etc. Moisture in steam by barrel Hoadley, Barrus, throttling, separating and chemical calorimeters. Heating value of coals determined by the bomb calorimeter. Heating value of gas by Junker's calorimeter. Flue gas analysis with Orsat's apparatus. Complete tests of steam engines, boilers, gas engines, injectors, pumps and entire plants. Standard reports. Carpenter and Diedrick's Experimental Engineering. Four hours Laboratory. First semester.

Prerequisite: M. E. 11 and 12. Two units.

Courses for Advanced Undergraduates and Graduates

M. E. 105. Machine Design. Selection of materials for machine parts. Proper working stress for different materials under dead, repeated and reversed loads. Determination of nature and distribution of stresses in each element of a machine. Friction. Design of such elements as crank shafts, machine frames, connecting rods, etc., when subject to tension, compression, shear, torsion, bending or any combination of these. Figuring weight and cost of manufacture. The kinematic layout of a machine for functional operation. The evolution of a design from preliminary sketch to complete working and assembly of drawings, involving a study of strength, adaptability, symmetry, ease of operation, depreciation and cost of manufacture. In all this work the note-book is as important as the drawings. Albert's Machine Design. Four hours Drawing. First semester.

Prerequisite: M. E. 4. Two units.

M. E. 106. Machine Design. Continuation of M. E. 105. One hour Lecture, four hours Drawing. Second semester.
Prerequisite: M. E. 105. Three units.

M. E. 107. Machine Design. Continuation of M E. 106. Four hours Drawing. First semester.
Prerequisite: M. E. 106. Two units.

M. E. 108. Power Plant Design. Sites. Comparison of high-speed engines. Corliss engines, steam turbines and gas engines. Cost and adaptability of different types of steam boilers. Condensers. Economizers. Superheaters. Pumps. Stokers. Piping. Complete layout of a plant with specifications and advertisements for bids. Fernald and Orrok's Power Plants. Two class hours, four hours Drawing. First semester. Four units.

M. E. 114. Shopwork. (a) Machine shop practice. Continuation of (b) M. E. 13.

(b) Shop management. In this course the student is given certain tasks and shopwork assignments to carry out and oversee. The system involves Managing, Planning, Routing, Stock and Tool Room methods, Production and Time Records, and actual supervising and handling of lower classmen. Shop visits. Lectures. Two hours Laboratory. First semester.
Prerequisite: M. E. 13. One unit.

M. E. 114a. Shopwork. Continuation of M. E. 114. Two hours Laboratory. Second semester. One unit.

M. E. 116. Mechanical Engineering Laboratory. Continuation of M. E. 15. Two hours Laboratory. Second semester.
Prerequisite: M. E. 15. One unit.

M. E. 117. Mechanical Engineering Laboratory. Continuation of M. E. 116. Four hours Laboratory. First semester.
Prerequisite: M. E. 116. Two units.

M. E. 118. Boilers. Heat: conduction, convection and radiation. Heat of evaporation. Combustion. Smoke. Quantity of air required. Methods of firing. Classification of coals. Efficiency of combustion. Boiler horse-power. Types of boilers. Furnaces. Stokers. Draft. Boiler scale. Water purification. Explosions. Testing. Care of boilers. Gebhardt's Steam Power Plant Engineering. Two class hours. First semester.
Prerequisite: Physics 13, 14. Two units.

M. E. 119. Steam and Gas Machinery. Properties of steam. Slide-valve. Indicator. Simple and compound engines. High speed, Corliss and marine engines. Turbines. Steam pumps. Locomotives. Valve gears. Governors. Flywheels. Balancing. Steam engine performance. Operation of two and four cycle gas and oil Engines. Indicator analysis. Gebhardt's Steam Power Plant Engineering. Three class hours. Second semester.

Prerequisite: M. E. 118. Three units.

M. E. 120. Thermodynamics. Mechanical theory of heat. First and second laws of thermodynamics. Perfect gases. Saturated vapors. Super-heated vapors. Hot air engine. Internal combustion engine cycles. Influence of engine cylinder walls. Friction of engines. Refrigerating machines. Injectors. Steam turbines. Ennis' Applied Thermodynamics. Three class hours. First semester.

Prerequisite: M. E. 119. Three units.

M E. 121. Internal Combustion Engines and Automobiles. The theory and design of gas, gasoline and oil engines, gas producer practice; the combustion of gaseous fuels. Streeter's Internal Combustion Engines. Two class hours. First semester.

Prerequisite: M. E. 120. Two units.

M. E. 122. Hydraulic Motors. Action of water on curved vanes. Forces developed and effect of impact. Work done. Centrifugal action. Reaction turbines. Vane form and arrangement. Axial, radial and mixed flow wheels. Losses due to friction, shock, leakage and residual velocity. Impulse turbines. Experiments with turbines of various types. Governors. Centrifugal pumps. Theory. Radial and curved vanes. Velocity of flow. Volute. Diffuser. Guide vanes in diffuser. Impeller passages. Balancing. Losses. Efficiency. Selection and arrangement of water-wheels. Governors and auxiliary apparatus. Relation between available water supply, possible output and perfection of development work. Draft tubes. Stop valves. Gates. Vacuum and pressure relief standpipes. Analysis of typical installations. Water power costs. Daugherty's Hydraulic turbines. Two class hours. Second semester.

Prerequisite: G. E. 121. Two units.

M. E. 123. Industrial Engineering. The economic element in shop processes. Conditions for most economic production. Functional operation of machine tools. Limits of economic production. Machines for performing specific operations. Time study. Labor saving devices in the shop. Distribution of cost of machine production between different processes, power, labor and material. Fixed

charges. Layout of shops for most direct production. Layout of system of management and cost determining system. Diemer's Factory Organization and Administration. Two class hours. First semester.
Prerequisite: M. E. 13. Two units.

M. E. 124. Industrial Engineering. Continuation of M. E. 123. Galbreith's Time Study. Three class hours. Second semester.
Prerequisite: M. E. 123. Three units.

M. E. 125. Heating and Ventilation. Theory and design of the various systems for heating and ventilating buildings, including Hot Air, Hot Water, Steam and the plenum and vacuum systems and central station heating. Hoffman's Handbook for Heating and Ventilating Engineers. Two class hours. First semester. Two units.

M. E. 126. Heating and Ventilation. Continuation of M. E. 125. Two class hours. Second semester.
Prerequisite: M. E. 125. Two units.

M. E. 170. Thesis and Seminar. Original investigation of some Engineering problem.

MODERN LANGUAGES

For courses in Modern Languages see Bulletin of the College of Liberal Arts, Department of Modern Language.

PHILOSOPHY

Courses for Advanced Undergraduates and Graduates

111. Logic. The reasoning faculties and processes. Laws of thought. Truth. Certitude. Doubt. False Systems. Three class hours. First semester. Three units.

112. Ontology, Psychology. Being, its origin, development, explanation. Life, its origin and kinds. Origin of Species. Darwinism. Huxley. Haeckel. The Soul, its origin and spirituality. Three class hours. Second semester. Three units.

113. Theodicy. God, His existence, nature and attributes. Creation. Providence. Miracles. Three class hours. First semester. Three units.

114. Ethics. Right and Wrong. Natural Law. Sanction of Law. False forms of Morality. Worship. Homicide. Suicide. Duelling. Society. Marriage. Divorce. Socialism. Theories of Government. Suffrage. Liberty of the press. Church and State. Three units.

For additional courses in Philosophy see the Bulletin of the College of Liberal Arts, Department of Philosophy.

PUBLIC SPEAKING

Described under courses in English.

RELIGION

Courses for Undergraduates

11. **Essentials of Christian Doctrine.** Various Creeds. The Apostle's Creed. Each Article of the Creed is studied in particular, attention being given to any subject bearing directly on these articles, as Sin, the Powers of the Church, Infallibility, etc. Two hours. First semester. One unit.

12. **Essentials of Christian Doctrine.** The Law of God. What is commanded or forbidden by the Decalogue is studied in detail. The Precepts of the Church, Grace, Prayer, and each of the Seven Sacraments together with collateral subjects. Two hours. Second semester. One unit.

13. **Christianity a Revealed Religion.** What Religion is. What Revelation is. Kinds of revelations. What revelation necessary to know truths above human knowledge. Man's attitude toward Revelation. Primitive, Patriarchal, Mosaic Revelation. The Divine origin of Pre-Christian Revelation. The Christian Revelation—its origin, evidences of the divinity of its origin. Two hours. First semester. One unit.

14. **The Church.** The Dispenser of the Christian Religion. Institution of the Church. End of the Church. Constitution of the Church. Marks of the Church. The teaching office of the Church. Sources of the Church's teaching. The Rule of Faith. Two hours. Second semester. One unit.

Courses for Advanced Undergraduates and Graduates

111. **God, the Author and Restorer of Our Salvation.** The existence, nature and attributes of God. The Divine Trinity. God, the creator of the universe. Various grades of creation. The spiritual and material world. Man. Relation of different orders of creation to one another. God, the Redeemer of fallen man. Decree and plan of redemption. The Redeemer—one person and two natures. The work of redemption. Two hours. First semester. One unit.

112. **The Plan of Redemption as Realized in Individuals.** Grace, actual, habitual or sanctifying. The Sacraments as a means of Grace. The Sacraments are studied in general—their matter and form; their efficacy and the dispositions requisite to receive them validly and with fruit. Then each Sacrament is studied in detail. The Church as a means of salvation. The four last things. Two hours. Second semester. One unit.

113. Christian Morals in General. Law as the objective norm of human actions. Conscience as the subjective norm of human actions. The conditions of morality. Moral good and moral evil. Two hours. First semester. One unit.

114. Christian Morals in Particular. The Christian's duties toward God—Faith, Hope, Charity. Religion. Direct and indirect acts of worship. The Church as the controller of religious worship. Duties towards ourselves and our neighbor—general and particular. Works of Supererogation or Christian Perfection. Two hours. Second semester. One unit.

SCIENCE

CHEMISTRY

11. General Inorganic Chemistry. For Engineers and Pre-Medics. Review of elementary principles and properties of the more important elements with their compounds. Includes a systematic study of important theories. Two hours Lecture. First semester. Two units.

12. General Inorganic Chemistry Laboratory. Laboratory course to accompany Chemistry 11. Four hours Laboratory. First semester. Two units.

13. Qualitative Analysis. A study of the principles of analytical chemistry. This course includes the descriptive chemistry of the metals. Two hours Lecture. Second semester.

Prerequisite: Chemistry 11, 12. Two units.

14. Qualitative Analysis Laboratory. Laboratory Course to accompany Chemistry 13. Dry and wet Analysis. Fundamental work in preparation for Quantitative Analysis. Four hours Laboratory. Second semester.

Prerequisite: Chemistry 11, 12. Two units.

For additional courses in Chemistry see Bulletin, College of Science, Department of Chemistry.

PHYSICS

Courses for Undergraduates

11. Mechanics, Molecular Physics, Sound. General principles of matter. General properties of Bodies. Equilibrium. Gravity. Pendulum. Properties peculiar to Solids. Capillarity. Hydro-dynamics. The properties of gases. Aerodynamics. Production, propagation and reflection of sound. The physical theory of music. Two hours Lecture. First semester. Carhart's College Physics. Two units.

12. **Physical Laboratory.** Laboratory course to accompany physics 11. Four hours Laboratory. First semester. Two units.

13. **Light, Heat, Electricity.** Transmission, velocity and reflection of light. Mirrors. Lenses. Dispersion and achromatism. Optical instruments. The eye. Double refraction. Interference and polarization. Properties of magnetism. Laws of magnetic action. Terrestrial magnetism. Quantitative laws of electric action. Distribution. Electrostatic induction of influence. Electric machines. Condensation of electricity. Voltaic cell. Its modifications. Magnetic field due to current. Galvanometers. Ohm's law. Conversion of electric energy into heat. Thermo-electricity. Electro-dynamics. Electro-magnets. Magnetism of iron. Telegraphy. Electro-magnetic induction. Passages of electricity through gases. Magneto and dynamo-electric machines. Diamagnetism. Connection between electricity and light. Carhart's College Physics. Two hours Lecture. Second semester.
Prerequisite: Physics 11, 12. Two units.

14. **Physical Laboratory.** Laboratory course to accompany Physics 13. Four hours Laboratory. Second semester.
Prerequisite: Physics 11, 12. Two units.

Courses for Advanced Undergraduates and Graduates

104. **Electric Measurements.** A laboratory course in Electrical Engineering. Two hours Laboratory. One semester.
Prerequisite: Physics 13, 14. One unit.

For additional work in Physics see Bulletin, College of Liberal Arts, Department of Physics.

INSTITUTE OF LAW

FACULTY

Zacheus Joseph Maher, S. J., A. M.
President

John Aloysius Lennon, S. J., A. M.
Dean of Faculties

Clarence Charles Coolidge, B. S., A. B., J. D.
Dean
Professor of Constitutional Law, Private Corporations, Equity and Conflict of Laws

Cornelius Joseph McCoy, S. J., A. M.
~~Director of Discipline~~

Nicholas Bowden, LL. B.
Professor of Agency, Legal Ethics and Partnership

Albert M. Casey, S. J., A. M.
Professor of Philosophy

Cornelius Francis Deeney, S. J., A. M., Ph. D.
Professor of Political Economy and Sociology

Edward Martin Fellows, Cert. Law
Professor of Common Law Pleading and Contracts

Faber Laine Johnston, J. D.
Professor of Property II, Code Pleading and California Practice

Allan Peter Lindsay, A. B. ? U. of C. ?
Professor of Negotiable Instruments, Bailments and Sales

Peter Francis Morettini, A. B., LL. B.
Judge of the Superior Court of the University Institute of Law

Albert Joseph Newlin, B. S., J. D. ? ?
Professor of Torts, Domestic Relations, Criminal Law and Criminal Procedure

Ronald Grant Stewart, A. B., J. D.
Professor of Elementary Law, Property I and Trusts

William Ward Sullivan, A. B., LL. B.
Professor of Mortgages and Insurance

Henry Woods, S. J., Ph. D.
Professor of Ethics

Mot Court

INSTITUTE OF LAW

INTRODUCTION

The purposes of the Institute of Law are:

To give a thorough training in the fundamental principles of English and American law, and the modifications thereof peculiar to the State of California;

To guide the student by actual practice in office work and court procedure to a proper application of the principles of law to concrete cases;

Finally, to imbue the student with the correct ethical principles that should govern the legal profession.

The method of instruction followed is the Case system—an exact discussion of the cases presented in the best manuals with a view to deriving the principles which have determined their decisions. This study of rules and principles is never lost sight of by the Professor and is rigidly exacted from the student in all examinations.

Lectures on particular phases of the law are given from time to time by the Faculty and by occasional lecturers.

Thorough courses in Philosophy and Political Economy, covering a period of two years are offered by the University in the College of Liberal Arts.

All law students who are candidates for the Degree of Bachelor of Arts or its equivalent are required to follow these courses.

Other law students are urged to do so but not obliged.

The Faculty strongly recommend all students to take advantage of these courses because they are of great value in developing the reasoning faculties and in grounding the student in sound principles of ethical conduct—two things absolutely necessary to the soundest and highest success in the legal profession.

The Institute of Law maintains a system of practice courts which is modeled essentially on the California system of courts of record, and consists of the Superior Court, the District Court of Appeals and the Supreme court. The court is held in a specially furnished courtroom.

The Superior Court is presided over by a member of the Faculty. The court holds weekly sessions at which business is transacted in the manner usual before state courts, with the constant instruction, advice and correction of the presiding judge. On given statements of fact, student counsel issue, serve and return regular processes, prepare and file the proper pleadings according to the California Code practice, argue demurrers, impanel juries, examine witnesses, and in brief, carry their cases through from summons to final judgment.

Every student in good standing is admitted to the bar in the beginning of his third year in the school and is required to act as counsel in not less than two cases in every semester. Subordinate officers of the court, clients, witnesses, and jurymen are drawn from among the second year students. All students, except those of the first two years, are required to attend every session of the courts and they receive credit therefor.

The District Court of Appeals and the Supreme Court hold sessions as often as business requires. They are also under the general supervision of a member of the Faculty.

No student in the Institute of Law is allowed to take the State Examination for admission to the Bar before he has completed successfully the course of study prescribed by the University for the LL. B. degree or the Certificate in Law, and until such successful completion of the course has been certified to by the Dean of the Institute of Law and by the Dean of the Faculties. Immediate exclusion from the Institute of Law will follow any violation of this regulation.

ENTRANCE REQUIREMENTS

The Institute of Law is open to the following classes of students:

1. Those who have the degree of Bachelor of Arts, Bachelor of Science, or their equivalent, from this or some other college or university.

2. Those who have completed the first two years of college work either at this University or at some other college or university offering satisfactory courses leading to academic degrees. Students of this class may complete their college work by following the Junior and Senior courses in Philosophy in the College of Arts and Sciences, and thus receive the degree of Bachelor of Arts or Philosophy or Science at the end of their second year in the Institute of Law, and the degree of Juris Doctor or Bachelor of Laws (according to their qualifications) at the end of the fourth.

Students of the first and second classes are **regular students.**

3. Graduates of approved high schools with credits of recommended grade whose experience in business or whose private study has made up for their lack of collegiate training and whose maturity and seriousness fit them in the discretion of the Faculty, for the study of law. Such are, for example, young men employed in insurance and real estate offices, banks, railroad offices and law firms, as well as those who have studied privately and so acquired knowledge for which, because of its variety and mode of acquisition, educational institutions are unable, as a rule, to give credit. These are **special students.**

Advanced Standing. Any person who has been in regular attendance for at least one academic year at another law school, having similar admission requirements, may in the discretion of the Faculty of the Institute of Law, and on such terms, with or without examination, as it may prescribe, receive credit for the work done at such other law school not exceeding in any case three years. The last year must be spent in residence in the Institute of Law.

REQUIREMENTS FOR GRADUATION

In order to graduate or receive the certificate, the student must have completed the regular course of four years of the Institute of Law. This implies:

1. Credit for at least sixty units (a unit is the equivalent of one hour a week for one semester). No one is allowed a unit in any course at which he has not been present ninety per cent of the class hours, and in which his average is not at least passing (seventy per cent).

2. Residence of at least four years in a standard law school, one year of which must have been spent in this Institute of Law.

3. The submission of a satisfactory thesis on some legal question selected by the student and approved by the Faculty.

The thesis must contain not less than five thousand words.

It must represent original work and thought, and consist of a thorough discussion of the cases bearing upon the subject, and must not be a mere series of extracts from cases or treatises, loosely strung together. Pertinent authorities must be cited by giving the volume and page, and also the particular case referred to. In addition to the ordinary citation, the writer should also give the place where the same case may be found in the selected case series and the Reporter system. It must be in typewriting on paper 8½x11 inches in size.

The submission of an acceptable thesis is an absolute prerequisite to admission to final examinations.

4. In addition to the above requirements, candidates for the Juris Doctor degree must pass all required tests in Roman Law, International Law, and the History of English Law.

Having thus qualified for graduation, the student will be given either the Degree of Juris Doctor (J. D.), the Degree of Bachelor of Laws (LL. B.), or a certificate stating that he has satisfactorily completed the course in legal subjects given in the Institute of Law.

The Degree of **Juris Doctor** will be conferred upon the following classes of students providing they have complied with Section 4 of the conditions of graduation:

1. Those who entered with the degree of A. B. or B. S., or their equivalent from this University or a college or university of recognized standing.

2. Those who, having entered with credit for the first two years of college work have completed the course in Philosophy and Political Economy along with their legal studies and have received the degree of A. B. or its equivalent from this University.

The Degree of **Bachelor of Laws** will be conferred upon the following classes of students:

1. Those possessing other academic degrees as just explained, who have not complied with Section 4 of the conditions of graduation.

2. Those who, having entered after the completion of the first two years of college work, have confined themselves to law, and have maintained throughout their course an average of eighty-five per cent in each subject separately.

3. Those who, having entered after the completion of the first two years of college work have done satisfactory work in some subjects included in the courses of Philosophy and Political Economy, such work being insufficient to warrant conferring on them the degree of A. B. or its equivalent, and who have, in addition, maintained throughout their course an average of eighty-five per cent in every legal subject. Where a student has done such work, but, while reaching a passing mark, has fallen below said average of eighty-five per cent in every legal subject, he may nevertheless be awarded the degree of Bachelor of Laws by special action of the Faculty, the degree of allowance made him being proportioned to the number of hours' work satisfactorily done in Philosophy and Political Economy.

The **Certificate** will be conferred upon the following classes of students:

1. Special students who have throughout their course maintained an average of eighty-five per cent in every legal subject.

2. Special students, who, in addition to their work in law have done satisfactory work in the courses in Philosophy and Political Economy or some subjects included therein, and who have also maintained an average of eighty-five per cent in every legal subject. Where a student has done such work, but, while reaching a passing mark has fallen below said average of eighty-five per cent in every legal subject, he may nevertheless be awarded the certificate, by special action of the Faculty, the degree of allowance made him being proportioned to the number of hours' work satisfactorily done in Philosophy and Political Economy.

DESCRIPTION OF COURSES

Courses for Undergraduates

1. Elementary Law. This is an elementary course intended primarily for undergraduates in the Pre-Legal course of the College of Liberal Arts, and is a prerequisite for all advanced courses in the Institute of Law. Robinson's Elementary Law. Three hours. First semester.

Prerequisite: Sophomore standing. Three units.

2. Elementary Law. A continuation of Law 1. Three hours. Second semester.

Prerequisite: Law 1. Three units.

Courses for Advanced Undergraduates and Graduates

First and Second Years

The completion of the courses in Elementary Law and at least two years of College work is a prerequisite for all the advanced Law courses.

101. Agency. Huffcut's Cases. First semester. Two and one-half units.

102. Bailments. Goddard's Cases. Second semester. One and one-quarter units.

103. Common Law Pleading. Sunderland's Cases. Second semester. Two and one-half units.

104. Contracts. Huffcut & Woodruff's Cases. First semester. Two and one-half units.

105. Criminal Law. Mikell's Cases on Criminal Law and Procedure. First semester. Two and one-half units.

106. Criminal Procedure. Mikell's Cases on Criminal Law and Procedure. First semester. One and one-quarter units.

107. Domestic Relations. Woodruff's Cases. Second semester. One and one-quarter unit.

108. Insurance. Woodruff's Cases. First semester. Two and one-half units.

109. Mortgages. Kirchway's Cases. Second semester. Two and one-half units.

110. Negotiable Instruments. Bunker's Cases. Second semester. Two and one-half units.

111. Property I. Warren's Cases. Second semester. Two and one-half units.

112. Property II. Finch's Cases. First semester. Two and one-half units.

113. Sales. Burdick's Cases. First semester.
One and one-quarter units.

114. Torts. Burdick's Cases. Second semester.
Two and one-half units.

Courses for Graduate Students

The completion of the first two years of the Law Course is a prerequisite for the taking of the following courses.

201. **California Practice.** Lectures, Code of Civil Procedure of California, and Selected California Cases. First semester.
Two and one-half units.

202. **Code Pleading.** Sunderland's Cases. Second semester.
Two and one-half units.

203. **Conflict of Laws.** Dwyer's Cases on International Law. First semester. Two and one-half units.

204. **Constitutional Law.** Evans' Constitutional Law. Second semester. Two and one-half units.

205. **Equity.** Throckmorton's Cases. First semester.
Two and one-half units.

206. **Evidence.** Wigmore's Cases. Second semester.
Two and one-half units.

207. **Legal Ethics.** Jessup: Professional Ideals of the Lawyer. Second semester. One and one-quarter units.

208. **Partnership.** Gilmore's Cases. First semester.
One and one-quarter units.

209. **Private Corporations.** Canfield and Wormser's Cases. Second semester. Two and one-half units.

210. **Trusts.** Kenneson's Cases. First semester.
Two and one-half units.

211. **Wills and Probate Law.** Costigan's Cases. Second semester.
Two and one-half units.

212. **Moot Court.** Practice Court. Both semesters for the III and IV years. One and one-quarter units each semester.

Courses for Graduate Students

221. **Roman Law.** Synopsis, quiz and written examinations. Sohm's Institutes of Roman Law (Ledlie) 3rd Edition. Hours and credits to be arranged.

222. **International Law.** Synopsis, quiz and written examinations. Taylor's International Law, "Cyc," "International Law," "War." Hours and credits to be arranged.

223. **History of English Law.** Synopsis, quiz and written examinations. Pollock & Maitland. Hours and credits to be arranged.

PRE - MEDICAL DEPARTMENT

PRE-MEDICAL DEPARTMENT

INTRODUCTION

This course, extending over two years, is designed to comply with the requirements of the best medical schools in the United States, and to give the student a preliminary laboratory training which will familiarize him with future work.

The entrance requirements for this course are listed in the Requirements for Admission to the College of Liberal Arts and are the standard requirements of the American Medical Association.

The minimum requirements for the junior certificate for those who intend to pass to a standard medical college must include twelve units of chemistry, eight units of physics, eight units of biology, six units of English and twelve units of other non-science subjects. Students are strongly urged to take courses also in modern languages, philosophy, mathematics, additional chemistry, Latin, and history.

SCHEDULE OF COURSES

Freshman

First semester	Units	Second semester	Units
English 1	3	English 2	3
Public Speaking 1	1	Public Speaking 2	1
Philosophy 11	3	Philosophy 12	3
Chemistry 11, 12	4	Chemistry 13, 14	4
Modern Language	3	Modern Language	3
Biology 1	3	Biology 2	3
Religion 1	1	Religion 2	1

Sophomore

Philosophy 13	3	Philosophy 14	3
Physics 1, 2	4	Physics 3, 4	4
Modern Language	3	Modern Language	3
Biology 3	4	Biology 4	4
Chemistry 21, 22	4	Chemistry 23, 24	4
Religion 3	1	Religion 4	1

DESCRIPTION OF COURSES

BIOLOGY

1. **General Biology.** An introductory course designed to lay a broad foundation of the general principles of biology as a part of a liberal education, as a preparation for the study of medicine, or for advanced work in science. Structure, life history, and physiology of typical animals are studied in the laboratory. Two hours Lecture; two hours Laboratory. First semester. Three units.

2. **General Biology.** A continuation of Biology 1. Two hours Lecture; two hours Laboratory. Second semester. Three units.

3. **Embryology.** Cell division, spermatogenesis, ovogenesis, fertilization, cleavage, gastrulation and the origin of the germ layers of various vertebrates and invertebrates. The study of the development of the different systems. The laboratory work includes a study of chick embryo living specimens, 24-72 hours of incubation. A study of chick embryo whole mounts up to 72 hours. A study of serial, cross and sagittal sections of chick embryo up to 72 hours. Two hours Lecture; four hours Laboratory. First semester.
Prerequisite: Biology 1, 2. Four units.

4. **Comparative Anatomy.** Comparative studies of adult forms, their organs and organ systems. The laboratory work is devoted to the critical dissection of the cat, and dog fish. Two hours Lecture; four hours Laboratory. Second semester.
Prerequisite: Biology 3. Four units.

CHEMISTRY

11. **General Inorganic Chemistry.** Review of elementary principles and properties of the more important elements with their compounds. Includes a systematic study of important theories. Two hours Lecture. First semester. Two units.

12. **General Inorganic Laboratory.** Laboratory course to accompany Chemistry 11. Four hours Laboratory. First semester. Two units.

13. **Qualitative Analysis.** A study of the principles of Analytical Chemistry. This course includes the descriptive chemistry of the metals. Two hours Lecture. Second semester.
Prerequisite: Chemistry 11, 12. Two units.

14. **Qualitative Analysis Laboratory.** Dry and wet Analysis. Fundamental work in preparation for Quantitative Analysis. Four hours Laboratory. Second semester.
Prerequisite: Chemistry 11, 12. Two units.

21. **Organic Chemistry.** A study of the compounds of carbon and their derivatives. The properties of the more important compounds are discussed, special attention is given to the alphatic series. Three hours Lecture. First semester.

Prerequisite: Chemistry 13, 14. Three units.

22. **Organic Chemistry Laboratory.** Laboratory course accompanying Chemistry 21. The typical cyclic and acyclic compounds are prepared and their properties investigated. Four hours Laboratory. First semester.

Prerequisite: Chemistry 13, 14. Two units.

23. **Quantitative Analysis.** Gravimetric and volumetric analysis. The work is regarded as preliminary training for more advanced work. Special attention is given to stoichimetrical relations and the application of the fundamental laws of chemistry to qualitative analysis. One hour Lecture. Second semester.

Prerequisite: Chemistry 21, 22. One unit.

24. **Quantitative Analysis Laboratory.** Laboratory course to accompany Chemistry 23. Four hours Laboratory. Second semester.

Prerequisite: Chemistry 21, 22. Two units.

PHYSICS

1. **Mechanics, Molecular Physics, Sound.** General principles of matter. General properties of bodies. Three hours Lecture. First semester. Carhart's College Physics. Three units.

2. **Physical Laboratory.** Laboratory course to accompany Physics 1. Two hours Laboratory. First semester. One unit.

3. **Light Heat, Electricity.** A continuation of Physics 1. (For full description see Bulletin, College of Liberal Arts.) Carhart's College Physics. Three hours Lecture. Second semester.

Prerequisite: Physics 1, 2. Three units.

4. **Physical Laboratory.** Laboratory course to accompany Physics 3. Two hours Laboratory. Second semester.

Prerequisite: Physics 1, 2. One unit.

ENGLISH, HISTORY, MATHEMATICS, MODERN LANGUAGES, RELIGION, PUBLIC SPEAKING, ADDITIONAL PHILOSOPHY AND SCIENCE

Courses are offered in these subjects in the College of Liberal Arts and are open to students in the Pre-medical Course. For detailed description of courses consult the Bulletin of the College of Liberal Arts.

THE OBSERVATORY

The
ASTRONOMICAL, METEOROLOGICAL AND SEISMOLOGICAL OBSERVATORY

Jerome Sixtus Ricard, S. J., A. M.
Director; Forecaster; and Seismologist

Albert Joseph Newlin, B. S., LL.B., J. D.
Associate in Meteorology and Seismology

The Astronomical, Meteorological and Seismological Observatory is under the immediate direction of Father Ricard, known through the country as the "Padre of the Rains". The University Observatory is one of a chain of seismological stations maintained by the Jesuits throughout the world and has been a pioneer on the Pacific Coast in the recording and observation of seismological disturbances, as well as in the study of their causes.

Of special prominence, however, is the work which has been done in long range weather forecasting through a study of sun spots. This line of study was instituted by Father Ricard over a generation ago and in the meantime he has built up a large mass of data in this regard so that the records and observations at the University are perhaps the most complete anywhere in the country. Monthly forecasts are sent out regularly from the Observatory.

In recognition of the work of Father Ricard the Knights of Columbus are building and endowing the Knights of Columbus Ricard Memorial Observatory, which will provide the facilities and equipment for a much more comprehensive investigation of meteorological and seismological conditions, and a correspondingly greater service to the country.

JESUIT
JUNIOR COLLEGE
AND
SEMINARY
LOS GATOS, CALIFORNIA

JESUIT JUNIOR COLLEGE

Rev. Leo S. Simpson, S. J., A. M.
Dean
Professor of Greek and Eloquence

Rev. Edward P. Kenney, S. J., A. M.
Vice-President

Rev. Michael Meyer, S. J., A. M.
Chaplain

Rev. James A. Colligan, S. J., A. M.
Professor of English and Greek

Edward Hageman, S. J., A. M.
Instructor of Latin, English and Education

Rev. Thomas A. Meagher, S. J., A. M.
Professor of Asceticism and Religion

Rev. Gabriel M. Menager, S. J., A. M.
Professor of Latin and Greek

Rev. George F. Weibel, S. J., A. M.
Professor of Latin and History

INTRODUCTORY STATEMENT

Sacred Heart Seminary, though under separate management and financially not connected with the University, is affiliated to it in its academic work, and all its courses are credited towards the obtaining of degrees. There are courses in Classics, English, Education, History, and Public Speaking, open to members of the Jesuit order only. The minimum prerequisite of academic work is the completion of standard high school requiring four years of Latin. Frequently the students have one or more years of college work to their credit before being admitted to the school. The regular course of religious and academic training comprises four years, the first two of which are largely devoted to religious exercises for the purpose of moral training and of developing those qualities of heart and character that are so important in any teacher, but most of all in the religious teacher. Study and academic instruction are not neglected, both being chiefly directed towards securing a solid foundation for the advanced work of the third and fourth years. These two years are wholly given to scholastic work. Students who are unable to do the work assigned to the last two years in a satisfactory manner and within the prescribed time are required to add another year to their course before being allowed to proceed to higher studies.

DESCRIPTION OF COURSES

Education

1. **The History of Ancient Education.** This course deals with the educational systems of Greece, Rome and Egypt; the early Christian cathedral and cloister schools; the rise of the universities; and the struggle of the Church to introduce civilization into western Europe. It aims, particularly, to give the student a cultural background and to acquaint him with those fundamental concepts of education that are a prerequisite to all criticism of purpose and methods. One unit.

2. **The History of Modern Education.** The history of education from the time of the Renaissance; the work of the great educational reformers; the development of national school systems in Europe and the United States. One unit.

3. **Principles of Secondary Education.** This course aims to acquaint the student with the function of the secondary school as a unit in our educational system. It treats of existing types of secondary schools; the special technic of the assignment and recitation; and the problems that confront the teacher in his relations with administrative officers, parents, and pupils. One unit.

4. **The Jesuit System of Secondary Education.** A historical and critical study of the Ratio Studiorum. Among the topics treated are: the importance of instruction in morality and the means of imparting it; the Jesuit ideal of a well-organized school; principles governing the selection and organization of subject-matter; the development of the power to reason, initiative, and the critical faculty; the proper use of the memory in education; the teacher's part in the recitation; the reasonable use of emulation; provision in Jesuit schools for individual differences. One unit.

English

1. **Teacher's Course in High School English.** The rhetoric of the high school, its organization and methods of presentation; the literature to be studied in the high school, its co-ordination with the other branches, its methods of study; the composition in the high school, its graduation and development, methods of correction, standards of evaluation. Two units.

2. **Advanced Rhetoric.** The theory of rhetoric, the study of style, and the requisites of the various species of writing. One unit.

3. **Study of Poetry.** The Intellectual, Imaginative and Emotional elements of poetry. The technic of versification. One unit.

4. **Early English Literature.** A general survey of the origin and development of the periods to 1750; chief writers and characteristics. Two units.

5. **English Literature.** An outline study of modern English literature. Two units.

6. **American Literature.** A survey course with emphasis on the chief influences and writers. Two units.

7. **Advanced English.** Seminary courses on special phases of the subjects; the origins and development of the language; the life and literature of the various periods; continental and the other influences; the national developments, their particular causes and results; the Catholic note in the life and literature of the various periods. Two units.

8. **Oratory.** Study of the oration, its sources of argument, its structure and delivery. One unit.

9. **Short Story.** Study of the story, its structure, and its development. One unit.

10. **Public Speaking.** (a) The fundamentals of Public Speaking. Training in voice, in appreciative reading and in platform speaking.

(b) A study of the formal and informal public speech; training in the lecture, address, and familiar instruction. Four units.

Greek

A-B Elementary Course. Etymology and syntax. Greek Reader, Anabasis. Exercises and themes based on Xenophon. Eight units.

1. Herodotus, Xenophon, Basil, Syntax Four units.
2. Chrysostom, Lucian, Homer, Syntax. Four units.
3. Plato: Defense of Socrates, Phaedro. Four units.
4. Demosthenes: Philippics, Olynthiacs, On the Crown. Four units.
5. Sophocles: Oedipus Tyranus, Antigone, Seven Against Thebes. Four units.
6. Selected Greek Lyrics. Two units.
7. Simple themes on rules of syntax. (Arnold's Greek Prose.) Two units.
8. Advanced themes. Two units.

Latin

Latin is taught as a living language.

1. Cicero: De Senectute, Oratorical Narrations, Pro Marcello, Pro Archia, Pro Lego Manilia. Four units.

2. Virgil: Eclogues, Georgics, Aeneid. Four units.

3. Livy. Two units.

4. Ovid: Metamorphoses, Elegies. Two units.

5. Horace: Odes, Epodes, Satires, Epistles. Four units.

6. Cicero: Pro Milone, In Catilinam, Pro Ligario. Two units.

7. Tacitus: Sallust. One unit.

8. Plautus: Captivi. Two units.

9. Latin Composition. (Arnold-Bradley's Latin Prose Composition.) Two units.

10. Latin Composition. (Bradley's Aid to Latin Prose.) Original Compositions. Latin Prosody. Two units.

History

1. **Ancient History.** Egypt; Assyria; the Pre-Hellenic Civilizations; Greece, Rome—their civilization and their influence; the Migrations of the Nations. Four units.

2. **Modern History.** Age of Charlemagne; Development of the Feudal System; the Crusades; the Papacy of the Middle Ages; the Hundred Years' War; the Renaissance; the Protestant Revolt; the Wars of Religion; the period of Louis XIV; French Revolution; Industrial Revolution and the Modern Democracies. Four units.

DEGREES CONFERRED

May 29, 1924

DOCTOR OF LAWS

Honoris Causa

John Joseph Tynan

BACHELOR OF LAWS

Tullio Anthony Argenti
Charles Richard Boden
James Michael Conners
George Louis Haneberg
John Thomas Lewis
George Bernard Noll
Ernest Victor Scettrini

CERTIFICATE IN LAW

Edward William Bacigalupi
Grandin Hunter Miller

BACHELOR OF ARTS

John Patrick Dempsey
Arthur James Saxe
Robert Emmett Shields

BACHELOR OF PHILOSOPHY

Paul D. Bean
Edward Ephraim Driscoll
Joseph Emmett Fleming
Joseph Theodore Geoffroy
Thomas Joseph Higgins*
George Bernard Noll
Elisandro William Palomares
Selah Thomas Pereira
Moise Henry Robidoux
William McKinley Roll*
Ernest Victor Scettrini
Andrew Matthew Scorsur
Raymond William Shellooe
Francis Earl Smith

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

Joseph Aloysius Madden

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

Ward Hugh Hahir*
Charles Christopher Harrington*
Alfred Victor Mainero
Raymond Edward McCauley
Harry Vandervost Miller
Henry Joseph Miller

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

Joseph Ernest Becker
Robert Joseph Gardiner

JUNIOR CERTIFICATES

Peter F. Aiello
Alexander B. Bigler
Alphonse J. Bihn
Henry W. Brown
Whitney A. Geiger
Nicholas L. Ivancovich
Saied N. Karam
Ernest O. McCormick
William G. McDonnell
Jack E. Nolan
Thomas J. Randazzo
Edgar A. Schimberg
Joseph A. Sheehan
Albert J. Steiss
Thomas W. Temple
Carroll F. Zapp
J. Howard Ziemann

* Cum laude.

DEGREES CONFERRED

May 25, 1925

BACHELOR OF LAWS

Paul D. Bean
Delwin A. Brunette
John P. Dempsey
Edwin E. Driscoll
Joseph T. Geoffroy
Thomas J. Higgins
Elisandro W. Palomares
Selah T. Pereira
Henry M. Robidoux
William M. Roll
Arthur J. Saxe
Andrew M. Scorsur
Robert E. Shields
Francis E. Smith
Thomas J. Trodden

CERTIFICATE IN LAW

John G. Stamp

BACHELOR OF ARTS

J. Marius Becchetti*
John M. Burnett
Thomas J. O'Neill

BACHELOR OF PHILOSOPHY

Ernest D. Bedolla
Alexander B. Bigler
Henry D. Boivin
Delwin A. Brunette
Richard M. Callaghan
William R. Costello
Raymond A. Ferrario
Jeremiah T. Harrington*
Philip B. Lynch
J. Thomas Maguire
Henry B. Martin
Vincent H. O'Donnell
Donald J. Pierr
Joseph F. Rank
Angelo V. Rianda
Timothy P. Sullivan
Harold J. Toso

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

David H. Clancy
Lawrence E. Duff
Robert A. Duff
Philip G. Fawke
James F. Flanagan*
George J. Fosdyke
Robert E. Page
Louis M. Pollard

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

Gunlek O. Abrahamsen
Frederick C. Coolidge
Francis A. King
Victor C. Pfeiffer
James B. Sheehan
Joseph A. Yudnich

* Cum laude.

JUNIOR CERTIFICATES

George L. Andre
Myron F. Babcock
Hugh J. Brown
Samuel A. Dagley
Joseph J. Deacon
Wallace K. Downey
Everett C. Erle
John J. Flynn
Peter J. Freiermuth
Joseph G. Gallagher
Gaspare J. Greco
Henry A. Lyddane
Emile D. Maloney
James P. McAuliffe
Archibald D. McDougall
Patrick H. McHugh
Richard F. McInerny
Albert J. Miller
Henry E. Mitchell
Richard E. O'Farrell
Terrence J. Parker
William C. Sellars
Fred Shapiro
Charles J. Vanoncini
Asher J. Wallace
William P. Williams
Carlton D. Young

EXTRAORDINARY PRIZES

1925

The Senior Nobili Medal was awarded to Raymond A. Ferrario.

Distinguished: Joseph A. Yudnich, Thomas J. O'Neill, Richard M. Callaghan, James A. Harrison, Lawrence J. Hufeisen, Ray J. Hulsman, Pierre M. Barceloux, Leroy Halloran.

The Silver Medal for Conduct and Application for University resident students was awarded to Francis A. King.

The Silver Medal for Conduct and Application for University non-resident students was awarded to Vincent Harrison O'Donnell.

Deserving Special Mention: James F. Flanagan.

Distinguished: J. Marius Becchetti, John M. Burnett, Edward P. Murphy, Albert J. Steiss, Joseph J. Deacon.

The Archbishop's Medal for Christian Doctrine was awarded to James Marius Becchetti.

Deserving Special Mention: John J. Flynn.

Distinguished: George A. Martinelli.

The Ryland Prizes for Debating were awarded to John May Burnett, James Marius Becchetti and Elisandro William Palomares.

Distinguished: William A. Ford, William, R. Costello, Timothy P. Sullivan.

The Owl Prize for Oratory was awarded to Edward Preston Murphy.

Distinguished: J. Marius Becchetti, John A. Spann, Joseph A. Bonacina.

The Orella Medal for Science was awarded to Dumas Joseph Testa.

The McCann Prize for the best Short story was awarded to Herman Jesse Phillips.

Distinguished: Victor J. Martin, Patrick Howe McCarthy, Philip B. Lynch.

The Redwood Prize for an Historical Essay was awarded to Leonard Frederick Reeg.

Distinguished: Redmond A. Early, William W. Burke, George A. Martinelli, Fenton J. McKenna.

The Alumni Prizes for essays on "My Ideal of a Loyal Alumnus" were awarded to James Marius Becchetti and Emile D. Maloney.

Distinguished: George W. Donohoe.

The William H. Leahy Prizes for the best original Playlet were awarded to Albert John Steiss, John Joseph Flynn and James Marius Becchetti.

Distinguished: George L. Andre, Pierre M. Barceloux.

The Dramatic Art Prizes were awarded to Edward Preston Murphy and Henry Beaumont Martin.

Distinguished: Vincent H. O'Donnell, William P. Fallon, Albert P. Crowder.

The Keenan Prize for the best essay on the Franciscan Missions in California was awarded to Herman J. Phillips.

Names given in order of award.

DONATIONS AND BENEFACTIONS

The President and Faculty of the University express their gratitude for the following benefactions:

To Miss Katherine Donohoe for the erection of the James and Rose Donohoe Memorial Infirmary, dedicated to the memory of her father and mother.

To ninety Alumni who have taken out $60,000.00 life insurance towards the creation of an endowment fund for the University.

To the California Jurisdiction of the Knights of Columbus and particularly to Hon. Thomas P. White, State Deputy, to Hon. Harry I. Mulcrevy, Chairman of the Committee, and to all the officers and members for the first installment of $25,000.00 towards the erection of the Knights of Columbus Ricard Memorial Observatory.

To Mrs. E. A. Filipello and Miss Ysabel de Saisset for $1,500.00 as a Student Loan Fund.

To the Educational Committee of the Knights of Columbus for a Needy Student Loan Fund $300 annually.

To Mrs. George A. Nicholson, $100.00; Mr. George Nicholson, Sr,. $100.00; Mr. Al Day, $100.00; Mr. Henry Richard, $100.00; Mrs. P. F. Dunne, $100.00; Mr. Peter Dunne, $100; and a friend, $1,000.00 for the furnishing of rooms in Kenna Hall.

To Mr. William Piggot, $500.00; Mr. Frank Sullivan, $300.00; Mr. J. E. Sexton, $300.00, and Hon. Frank J. Sullivan, $150.00, as personal gifts to Rev. Father Ricard.

To Mrs. Florence Berg, $150.00, and Dr. H. J. Sartori, $100.00, for Alumni Science Hall.

To Messrs. Archer and Nicholas Bowden, Roy Bronson, C. M. Castruccio, Miles Fitzgerald, Faber Johnston, Plowden John Mott, E. M. Rosenthal, Maurice Rankin, and William Shipsey for contributions to the law library.

To Mr. William H. Leahy for advice and direction in the remodeling of the Theater and for expert assistance in planning the stage, seating and light arrangements.

To the estate of Dr. Alfred Eichler for a microscope.

To Mrs. Glubetick Harper for a collection of South American butterflies.

To Mr. Clarence C. Coolidge and Mr. Edward Nicholson for professional services.

To Dr. Fred C. Gerlach for professional services.

To Lion & Co. for gifts of furniture.

To the donors of the various medals and prizes.

To Mrs. E. Bedolla, $100.00; Mr. Maurice Hayes, $100.00, and other friends for a new carpet for the Students' Chapel.

To the Alumni of the University for a Student Loan Fund of $500.00.

To Mr. Herman Budde for the Herman Budde Prize for 1925.

To an alumnus for Alumni Science Hall, $5,000.00.

To a friend for the University Auditorium, $10,000.00.

To the estate of Michael Farrell, $500.00.

To Hon. George H. Buck, $100.00 for a Student Loan Fund.

To Mr. Michael Griffith, State Deputy of the Knights of Columbus and his associates for an additional $12,000.00 for the K. C. Ricard Memorial Observatory.

To Dr. Fred C. Gerlach for the donation to the Donohoe Infirmary of an X Ray equipment valued at $1,500.00.

To Mr. Henry C. Miller for his capable and faithful supervision of the construction and remodeling of the University buildings.

The following Alumni have taken out insurance to date:

Joseph Arbura
Reginald Archbold
James Bacigalupi
George Boles
Archer Bowden
Richard Bressani
Roy Bronson
Dr. Joseph Richard Brown
Herman Budde
Leland Calice
Robert E. Camarillo
Manuel Carrera
Joseph G. Carey
C. M. Castruccio
Clarence C. Coolidge
Thomas Concannon
John A. Corotto
Mario Corsiglia
John A. Cronin
Christopher Degnan
Herman Dieringer
Leopold Di Fiori
Paul Donlon
William Donovan
Maurice Dooling
Francis Dowd
Thomas Feeney
Joseph Fitzpatrick
John P. Foley
Charles Foley
Byington Ford
John Forster
Ignacio Forster
Brian Gagan
Hugh Gallagher
Rev. James Galvin

George W. Geoghegan
Frank B. Hagan
Frank Hennessy
Joseph Hewitt
Fred Hoedt
John B. Hudner
John L. Hudner
Elmer Hyland
William R. Jacobs
Wiliam E. Johnson
Dr. Alexander Keenan
Eugene Kelly
Joseph Kelly
George Kennedy
William Kieferdorf
Emil Larrouy
John G. Liebert
Marcel Lohse
Robert V. Lohse
Robert V. Lotz
William D. Lotz
James P. Maher
Michael Maloney
Nicholas J. Martin
Jordan Martinelli
Robert E. McCabe
Henry McGowan
William McKinnon
Emmet G. McMenamin
Cornelius L. Monaghan
Peter Morettini
Andrew Mullen
Edward Nicholson
Edward E. Nino
Oliver G. Nino
Louis Normandin
Frank T. O'Neill
Michael Plunkett
Louis F. Putman
Bernard J. Perry
Albert A. Quill
Joseph Rianda
Ray Rudolph
John B. Shea
Gerald Sheehy
Daniel Shelloe
Fred Sick
Orvis Speciale
Dr. George L. Sullivan
Timothy Sullivan
John H. Thompson
Dr. Joseph M. Toner
Chauncey Tramutolo
Elmer Westlake
John J. Wilson
Leo Wagner

UNIVERSITY FACULTY: 1924-1925

Zacheus Joseph Maher, S. J., A. M.
President

Cornelius Joseph McCoy, S. J., A. M.
Vice-President, Director of Discipline

William Ignatius Lonergan, S. J., A. M., LL. B. *
Dean of the Faculties, Registrar, Director of Studies

John Aloysius Lennon, S. J., A. M. **
Dean of the Faculties, Registrar, Director of Studies

Clarence Charles Coolidge, B. S., A. B., J. D.
Dean of the Institute of Law; Professor of Law

George Leonard Sullivan, B. S., M. E., Ph. D.
Dean of the College of Engineering; Professor of Mechanical Engineering

William H. Pabst
Dean of the College of Business Administration

John Joseph Hayes, S. J., A. M.
Secretary and Treasurer

John Peter Mootz, S. J., A. M.
Chaplain; Professor of Philosophy

Joseph Matthew Georgen, S. J., A. M.
Superintendent of Buildings and Grounds

Edmund Joseph Ryan, S. J., A. M.
Moderator of the Associated Student Body, and of the Alumni Association, Faculty Director of Athletics

Joseph Casimir Sasia, S. J., A. M.
Librarian

Charles Daniel South, M. A., Litt. D.
Librarian: Students' Library

Frederick Gerlach, M. S., M. D.
Visiting Physician and Surgeon

Camillo D'Allessio, Nap. R. C. M.
Director of Music

Martin V. Merle, A. M.
Director of Dramatics

Edgar H. Kienholz, M. S.
Director of Physical Education

Lawrence Archer Bowden, LL. B.
Professor of Law

Nicholas Bowden, LL. B.
Professor of Law

Frank Hobart Bloomingdale, LL. B.
Professor of Law

Richard Valentine Bressani, A. B., LL. B.
Professor of Law

Charles J. Budde, S. J., A. M.
Professor of Geology

Arthur Vincent Coghlan, S. J., A. M.
Professor of English

Joseph J. Conlon, S. J., A. M.
Professor of Chemistry

Cornelius Francis Deeney, S. J., A. M., Ph. D.
Professor of Political Economy and Sociology

David Burris Draper, A. B., M. D.
Professor of Biology

Joseph Robert Fernandez
Professor of Spanish

Demetrius Wilbur Griswold, E. E.
Professor of Electrical Engineering

Faber Laine Johnston, J. D.
Professor of Law

John Joseph Jones, A. B., LL. B.
Professor of Law

James Francis Kearney, S. J., A. M.
Professor of English, Public Speaking, Latin and History

Henri Lecat, Brev. Sup. Paris
Professor of French

William Dirvin Lotz, B. S.
Professor of Civil Engineering

Edward D. Maginnis, S. J., A. M.
Professor of Mathematics

Albert Joseph Newlin, B. S., LL. B., J. D.
Professor of Law; Associate in Meteorology and Seismology

Jerome Sixtus Ricard, S. J., A. M.
Director of the Observatory; Professor of Astronomy, Meteorology and Seismology

Joseph Riordan, S. J., A. M.
Professor of Philosophy

James Patrick Sex, Ph. D., J. D. ***
Professor of Law
Professor of Philosophy

Philip George Sheehy, LL. B., C. P. A.
Professor of Accounting

Ronald Grant Stewart, A. B., J. D.
Professor of Law

Bartholomew Richard Sullivan, B. A.
Professor of Commercial Geography

William Ward Sullivan, A. B., LL. B.
Professor of Law

Joseph A. Vaughan, S. J., A. M.
Professor of Physics

Anthony O. Villa, S. J., A. M.
Professor of Italian

William Wallrath, S. J., A. M.
Professor of German

Henry Woods, S. J., Ph. D.
Professor of Ethics

* To April 1, 1925.
** From April 1, 1925.
*** Deceased.

REGISTER OF STUDENTS

Abbreviations Used

B. A.—College of Business Administration.
Engr.—College of Engineering.
Ext.—Extern, living outside the University.
Fr.—Freshman.
Jr.—Junior.
Let.—Letters, College of Liberal Arts.
Premed.—Premedical Department.
Res.—Resident, living within the University.
Soph.—Sophomore.
Spec.—Special, not in regular course.
Sem.—Seminary.
Sr.—Senior.

Abrahamsen, Gunlek Olavus	Sr. Engr.	Res.	San Francisco
Aiello, Peter Francis	Jr. Let., I Law	Ext.	San Jose
Andre, George Lawrence	Soph. Let.	Res.	San Luis Obispo
Babcock, Myron Franklin	Soph. Premed.	Res.	Long Beach
Backus, Herbert Francis	Soph. Let.	Ext.	Palo Alto
Baker, Roy Marion	I Law	Res.	Long Beach
Bannan, Philip Lawrence II	Soph. Engr.	Res.	San Francisco
Barceloux, Pierre Marcell	Soph. Let.	Res.	Willows
Battle, Martin Patrick	Sr. Let., II Law	Ext.	Santa Clara
Bean, Paul Dows	III Law	Ext.	San Jose
Becchetti, James Marius	Sr. Let., II Law	Ext.	San Jose
Bedolla, Ernest Delmo	Sr. Let., II Law	Ext.	Santa Clara
Berry, Lloyd, Leroy	Jr. Engr.	Ext.	Santa Clara
Bigler, Alexander Bowman	Sr. Premed.	Res.	Santa Maria
Bigler, William Dock	Sr. Engr.	Res.	Santa Maria
Bihn, Aphonsus Joseph	Jr. Let., I Law	Ext.	San Jose
Bihn, Leo John	Fr. B. A.	Ext.	San Jose
Blackinger, John Regan	Fr. B. A.	Res.	Boise, Idaho
Boivin, Harry Dolan	Sr. Let., II Law	Ext.	Santa Clara
Boland, James Bernard	Fr. Let.	Res.	San Francisco
Boland, William Ignatius	Fr. Engr.	Res.	San Francisco
Bonacina, Andrew Joseph	Soph. Let.	Res.	Arcata
Boyd, Robert Woodworth	Fr. Engr.	Res.	Yuba City
Bradley, Griffin Randolph	Fr. B. A.	Ext.	Watsonville
Brady, Augustine William	Fr. Let.	Ext.	Santa Clara
Brady, Edward John	Fr. Let.	Ext.	Santa Clara
Brandt, Wallace George	Soph. B. A.	Res.	Calexico

Breslin, Victor James	Fr. Let.	Res.	Santa Barbara
Brown, Henry Wilfred	Jr. Let., I Law	Ext.	San Mateo
Brown, Hugh James	Soph. Premed.	Res.	Butte, Mont.
Brunette, Delwin Augustus	III Law	Res.	King City
Bundy, John Herold	Soph. Engr.	Res.	Umapine, Ore.
Bunker, Edwin Emmons	Fr. B. A.	Res.	Gustini
Burkard, Benedict Adrian	Fr. B. A.	Res.	Santa Barbara
Burke, William	Fr. B. A.	Ext.	San Mateo
Burnett, John May	Sr. Let., II Law	Ext.	San Jose
Burnett, Louis Swanton	Fr. B. A.	Res.	San Francisco
Burnett, Theodore Thomas	Fr. B. A.	Res.	San Francisco
Burns, Thomas Matthew	Fr. Premed.	Res.	Taft
Butler, William Howard	Fr. B. A.	Res.	Calistoga
Caletti, W. Carlo	Sr. Engr.	Res.	San Rafael
Callaghan, Richard Michael	Sr. Let., II Law	Res.	Livermore
Campisi, Vincent	Fr. Let.	Res.	Los Angeles
Compodonico, Albert Laurence	Jr. Let., I Law	Res.	San Francisco
Carney, Ignatius John	Sr. Let., II Law	Ext.	Denver, Colo.
Carr, Carl Butler	Fr. Let.	Ext.	San Jose
Carroll, Frank Bernard	Fr. Let.	Ext.	San Jose
Carson, Ralph Andrew	Fr. B. A.	Ext.	Milpitas
Casanova, Leonard Joseph	Soph. Let.	Res.	Ferndale
Cavalier, David Joseph	Jr. Engr.	Ext.	Prince Rupert, B. C.
Caveney, Eldred Joseph	Fr. Engr.	Ext.	San Francisco
Chargin, Gerald Stephen	Soph. Let.	Ext.	San Jose
Chisholm, Roderick Alex	Fr. Engr.	Res.	San Francisco
Clancy, David Henry	Sr. Engr.	Ext.	Santa Clara
Connolly, John Leonard	Fr. Let.	Res.	Ukiah
Coolidge, Frederick Clarence	Sr. Engr.	Ext.	San Jose
Costello, William Richard	Sr. Let., II Law	Res.	San Francisco
Coughlin, James Stephen, Jr.	Fr. Engr.	Res.	Redding
Crowder, Albert Patrick	Fr. Premed.	Ext.	San Jose
Cummings, Edward	Fr. B. A.	Res.	Telachapi
Cunningham, Jere Falvey	Fr. Let.	Ext.	Boulder Creek
Cunningham, Richard Joseph	Fr. Premed.	Res.	Sacramento
Dagley, Samuel Andrew	Soph. Let.	Res.	Pasadena
D'Arcy, Nicholas Anthony, Jr.	Fr. Engr.	Res.	Burbank
Dardi, Virgil Dave	Fr. Let.	Res.	Santa Barbara
Day, Carroll Eugene	Soph. B. A.	Ext.	Santa Clara
Deacon, Joseph James	Soph. Let.	Ext.	Santa Clara
Degnan, James Leonard	Soph. B. A.	Res.	Rohnerville

Degnan, Lawrence	Soph. B. A.	Res.	Rohnerville
Delaney, Nicholas King	Fr. Engr.	Ext.	San Jose
Del Mutolo, Maraino Gaspero	Sr. Let., II Law	Ext.	San Jose
Dempsey, John Patrick	III Law	Ext.	San Jose
Devine, Bernard Aloysius	Jr. Engr.	Res.	San Francisco
Diepenbrock, Victor Leo	Fr. Let.	Res.	San Francisco
Dias, Paul Joseph	I Law	Ext.	San Jose
Di Benedetti, Frank Reliance	Fr. Engr.	Ext.	San Jose
Di Paoli, Pasquale Mario	Fr. Engr.	Ext.	San Jose
Donahue, Robert William	Fr. Engr.	Res.	Danville
Donohoe, John James	Fr. B. A.	Res.	San Francisco
Donohoe, George William	Soph. Let.	Res.	San Francisco
Donovan, Edward Owen	Fr. B. A.	Ext.	San Jose
Downey, Wallace Kerrick	Soph. Let.	Res.	Newman
Draper, Frank James	Fr. B. A.	Res.	Morgan Hill
Driscoll, Edwin Epharim	III Law	Ext.	Klamath Falls, Ore.
Duff, Lawrence Eugene	Sr. Engr.	Res.	Medford, Ore.
Duff, Robert Alexander	Sr. Engr.	Res.	Medford, Ore.
Early, Redmond Allan	Fr. Let.	Res.	Petaluma
Erle, Everett Charles	Soph. B. A.	Ext.	San Jose
Estralla, Joseph Leo	Fr. Premed.	Ext.	Santa Clara
Ethen, Lawrence Joseph	Fr. B. A.	Ext.	Palo Alto
Fallon, William Alphonsus	II Law	Ext.	San Francisco
Fatjo, Luis Paul	Soph. B. A.	Res.	San Francisco
Fawke, Philip Guy	Sr. Engr.	Res.	San Francisco
Fernando, Patricio Castro	Fr. Engr.	Res.	San Francisco
Ferrario, Raymond Anthony	Sr. Let., II Law	Res.	Livermore
Fisher, William Porter	Soph. Engr.	Res.	Gold Hill, Ore.
Flanagan, James Francis	Sr. Engr.	Ext.	Sacramento
Fletcher, George Edwin	Soph. Engr.	Ext.	San Jose
Flynn, John Joseph	Soph. Let.	Res.	Palo Alto
Flynn, Thomas Joseph	Soph. Premed.	Res.	San Fernando
Foley, Russell Joseph	Fr. B. A.	Ext.	Santa Clara
Ford, William Anthony	Jr. Let., I Law	Res.	Stockton
Fosdyke, George James	Sr. Engr.	Res.	Los Angeles
Friedenbach, Paul Edward	Fr. Let.	Res.	Fortuna
Freirmuth, Peter Joseph	Soph. Premed.	Res.	Watsonville
Fusco, Carlo Joseph	Fr. B. A.	Res.	San Francisco
Gallagher, Joseph Gordon	Soph. Let.	Res.	San Francisco
Genestra, John Victor	Fr. Premed.	Res.	Stockton

Geoffroy, Joseph Theodore	III Law	Ext.	San Jose
Girard, McCone Wilfred	Fr. Premed.	Res.	San Francisco
Good, James Francis	Fr. Let.	Res.	Oroville
Good, Otto Eugene	Fr. Engr.	Res.	Oroville
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Abbreviations:

B. A. College of Business Administration
Engr. College of Engineering
Law Institute of Law
L. A. College of Liberal Arts
P. M. Pre-Medical Department
Sem. Seminary

Courses: Liberal Arts courses given to students in other colleges are described under the Courses in the College of Liberal Arts. Cross reference may be had to the alphabetical arrangement of courses in the respective colleges.

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